

FIG. 2

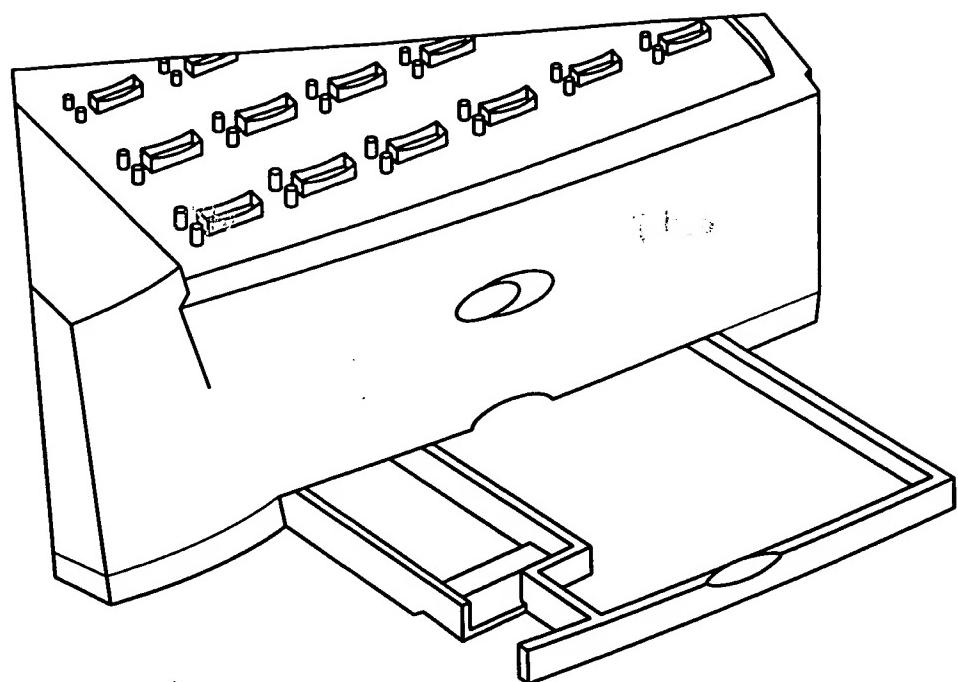


FIG._3A

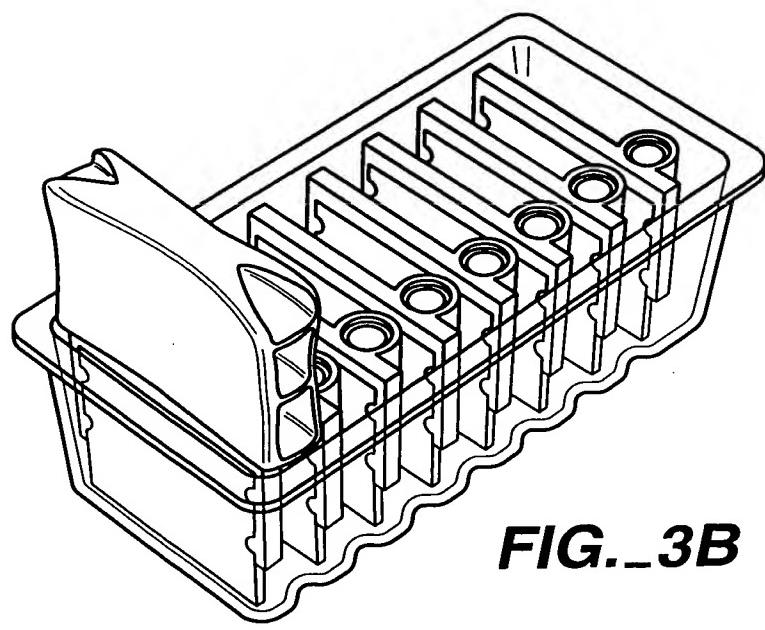


FIG._3B

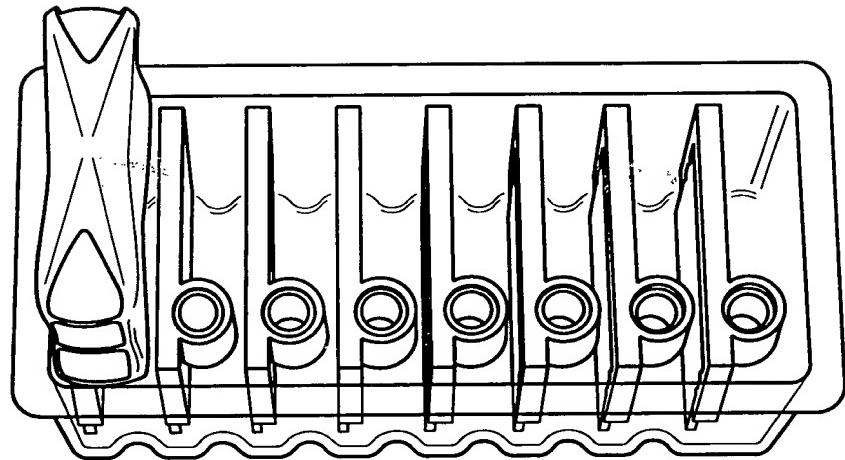


FIG._3C

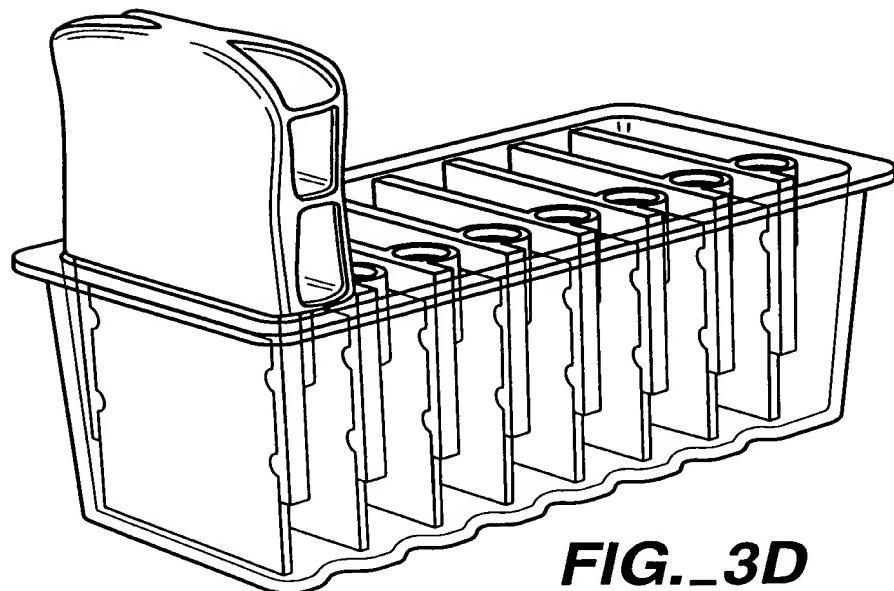


FIG._3D

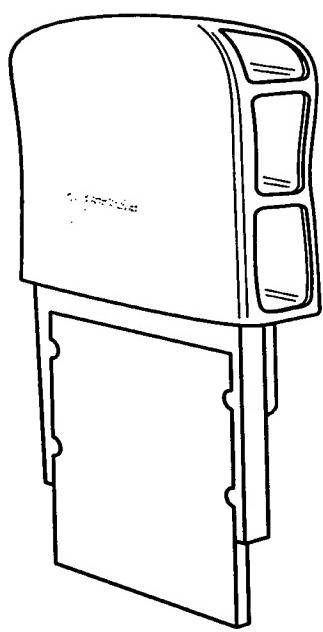


FIG._3E

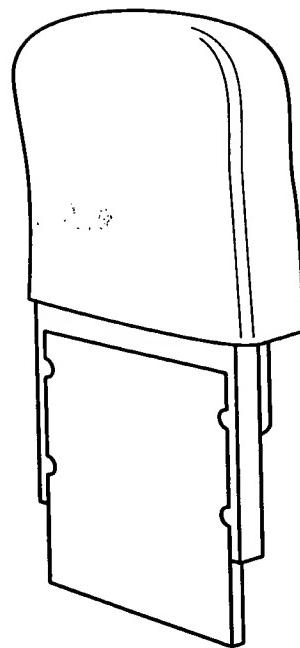


FIG._3F

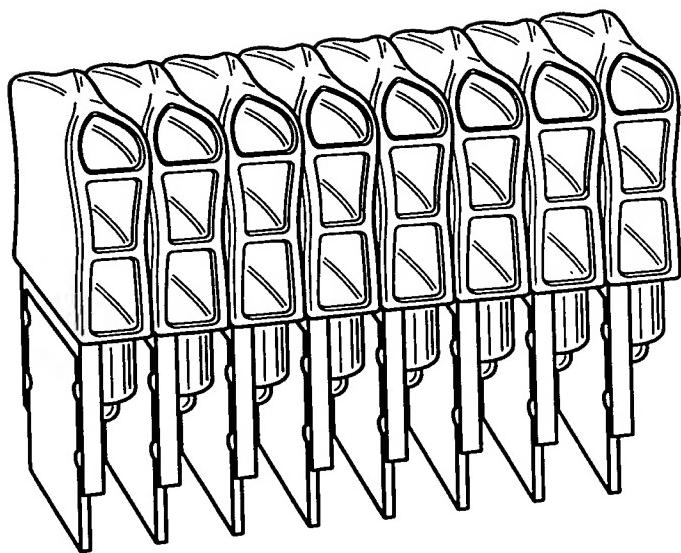


FIG._3G

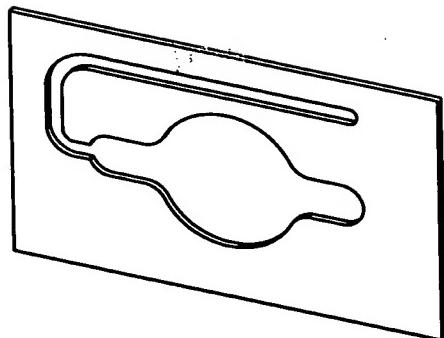


FIG._4A

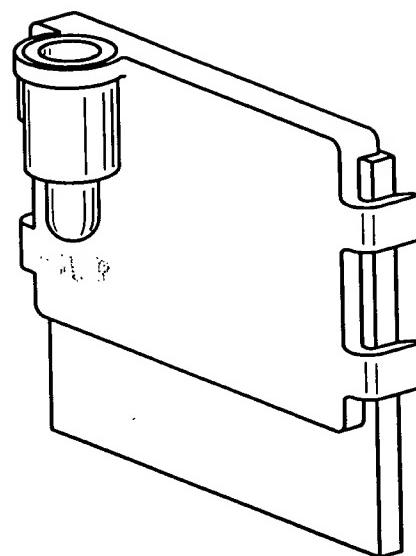


FIG._4B

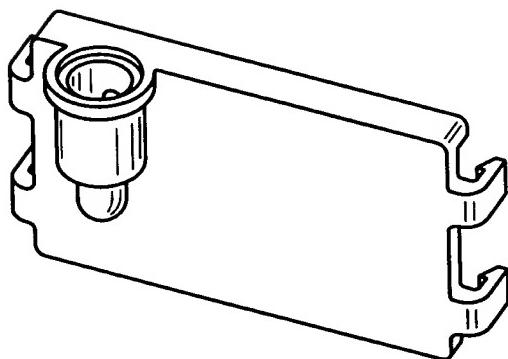


FIG._4C

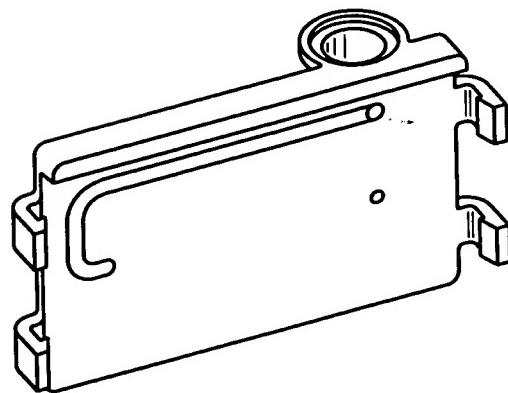


FIG._4D

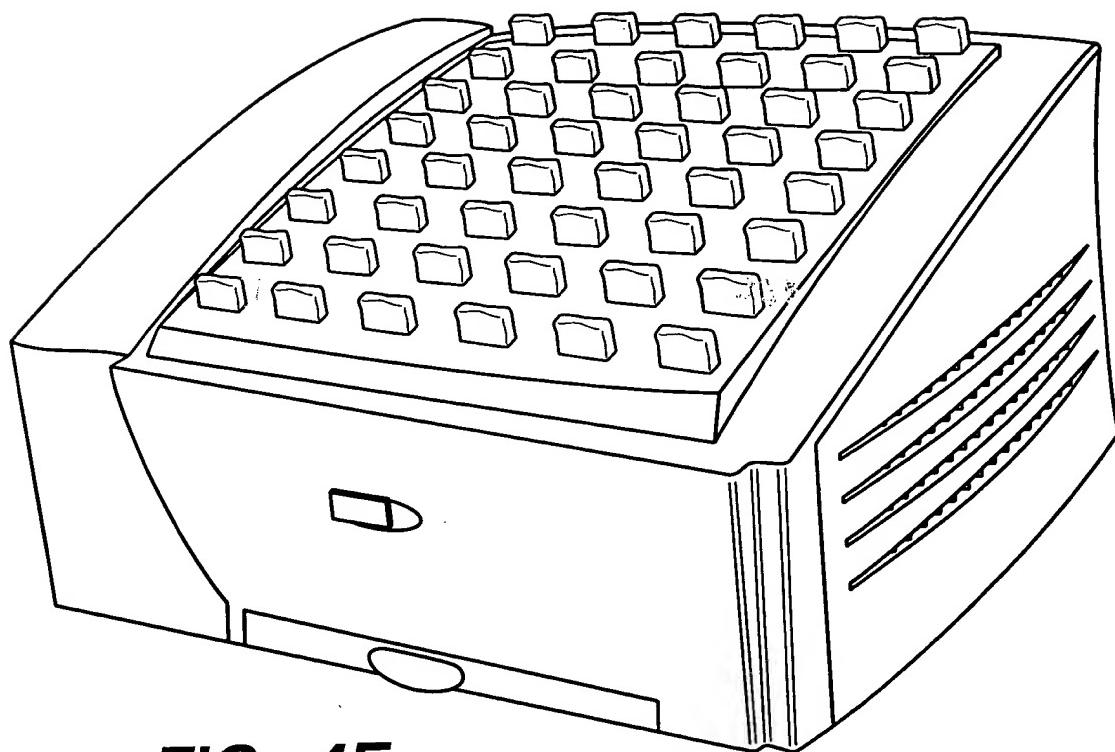


FIG._4E

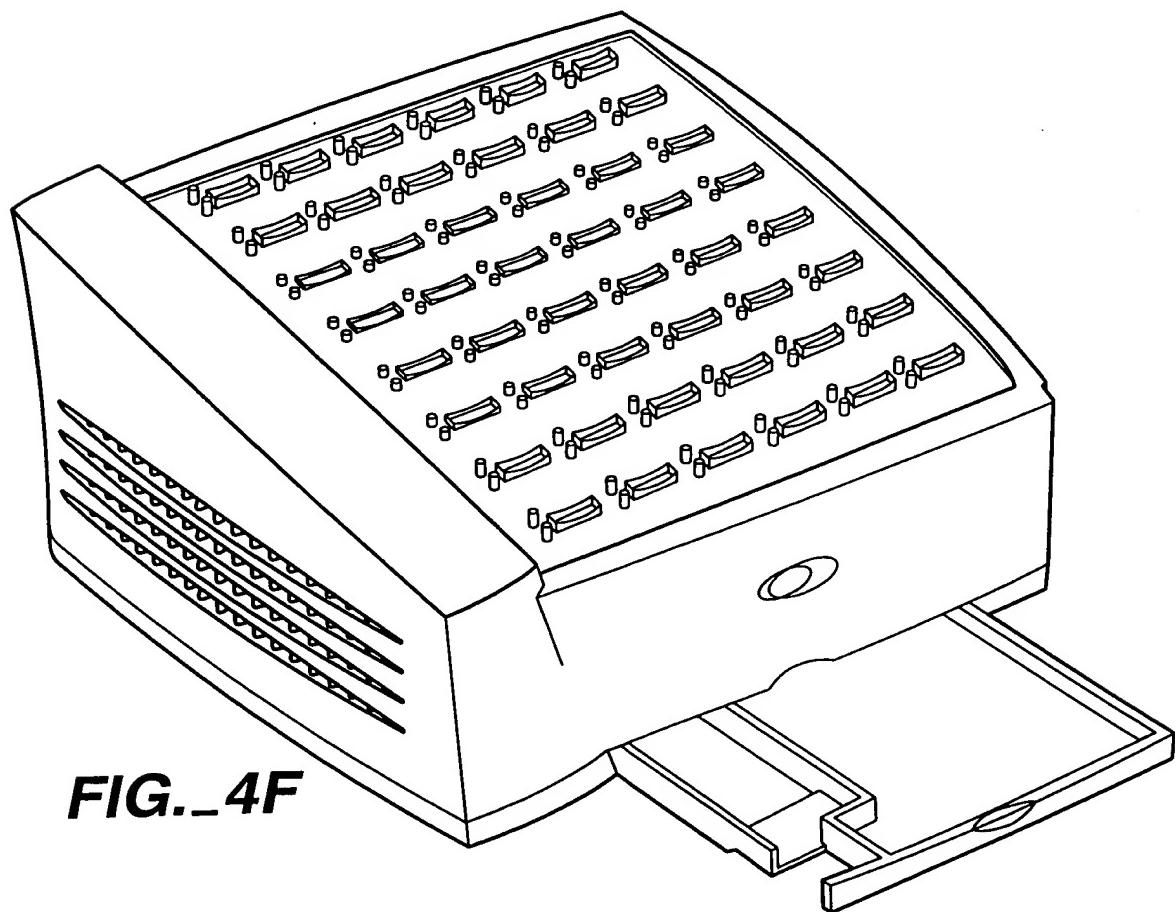


FIG._4F

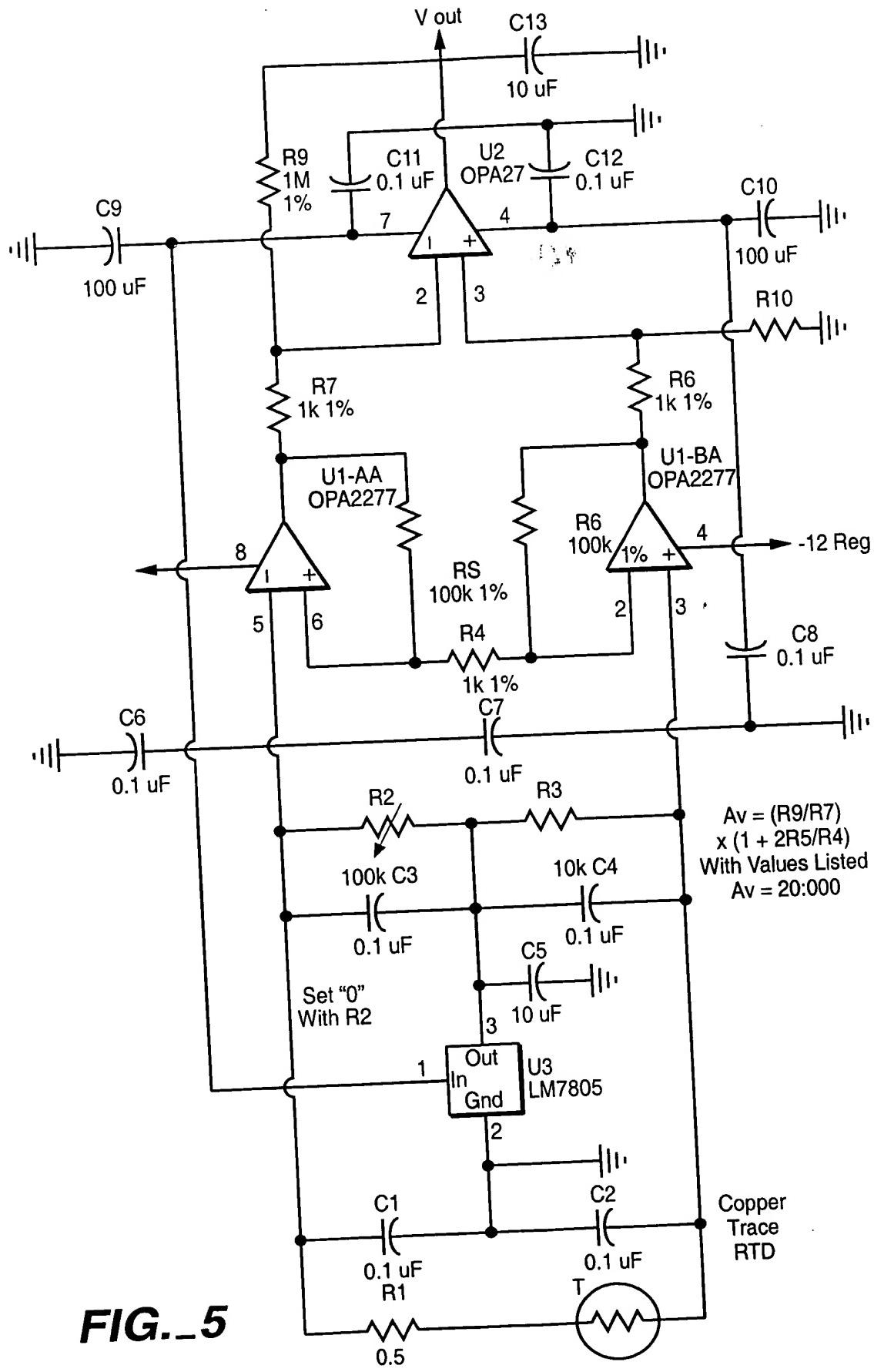
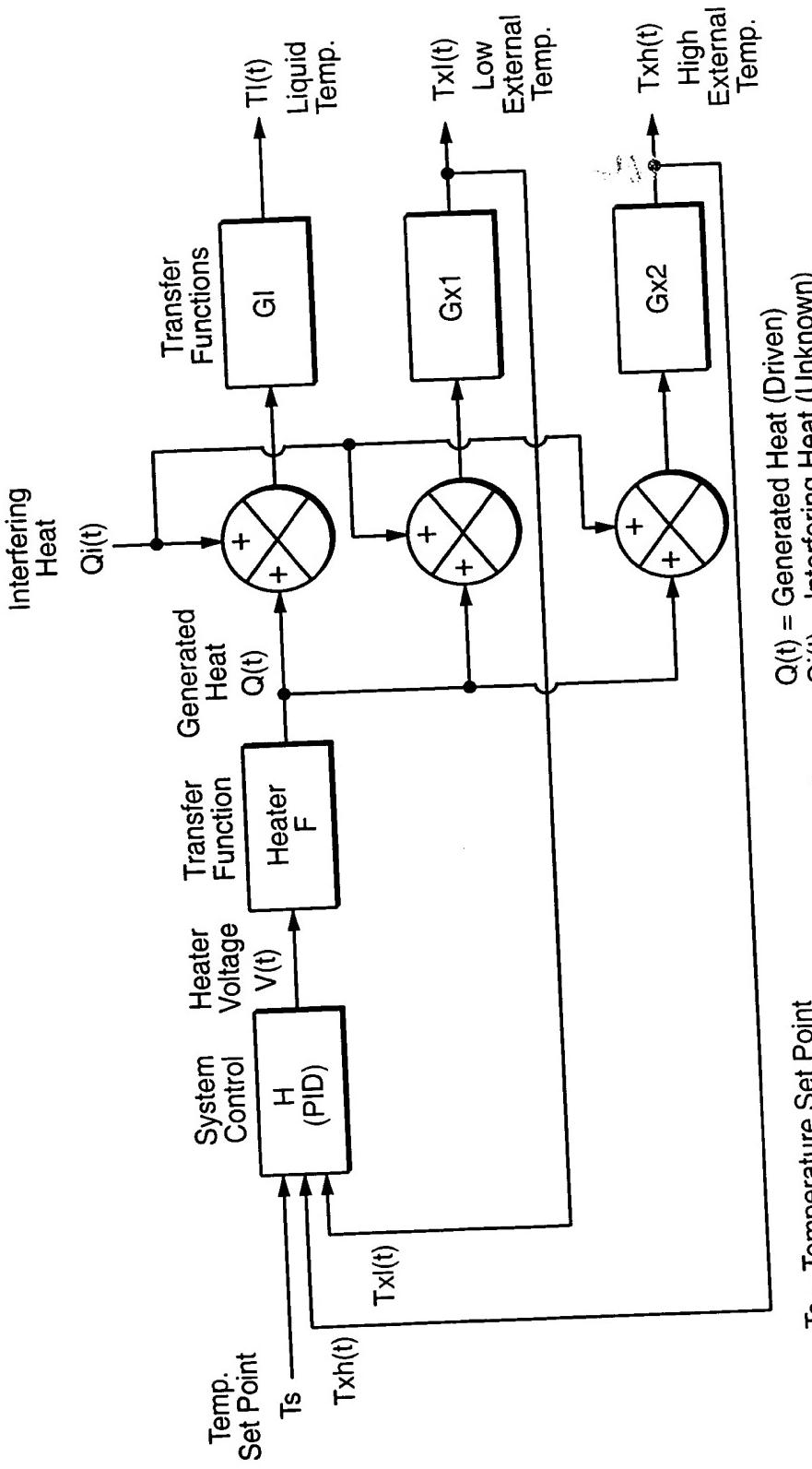


FIG.-5



$Q(t)$ = Generated Heat (Driven)
 $Q_i(t)$ = Interfering Heat (Unknown)
 F, G_I, G_{x1}, G_{x2} = Transfer Functions (Unknown)
 H = System Control Function (tbd)

T_s = Temperature Set Point
 T_{xi} = External Temperature 1, Low (Measured)
 T_{xh} = External Temperature 2, High (Measured)
 T_l = Liquid Temperature (Desired)
 $V(t)$ = Heater Voltage (Driven)

FIG._6

FIG. 7

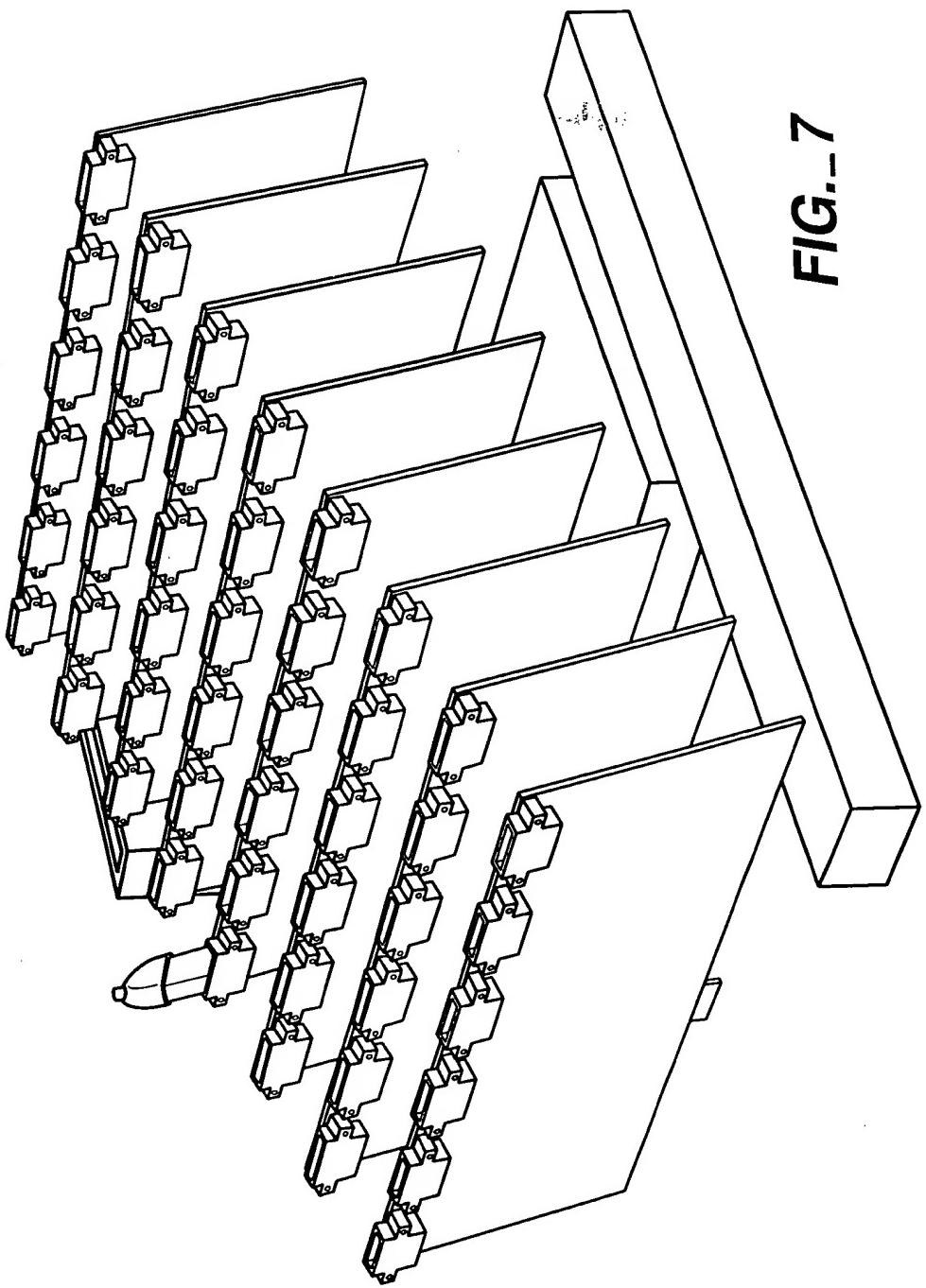
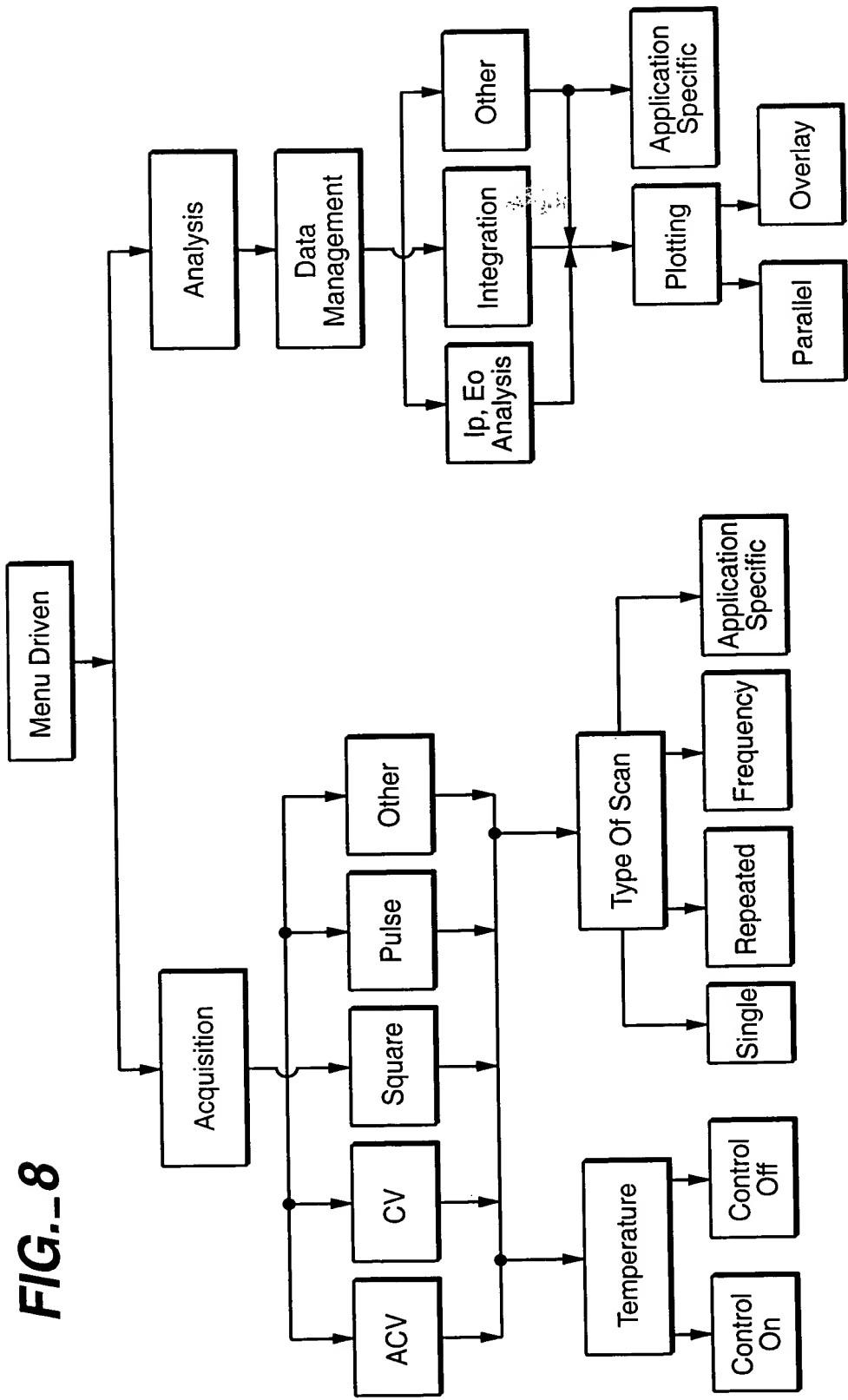


FIG.-8



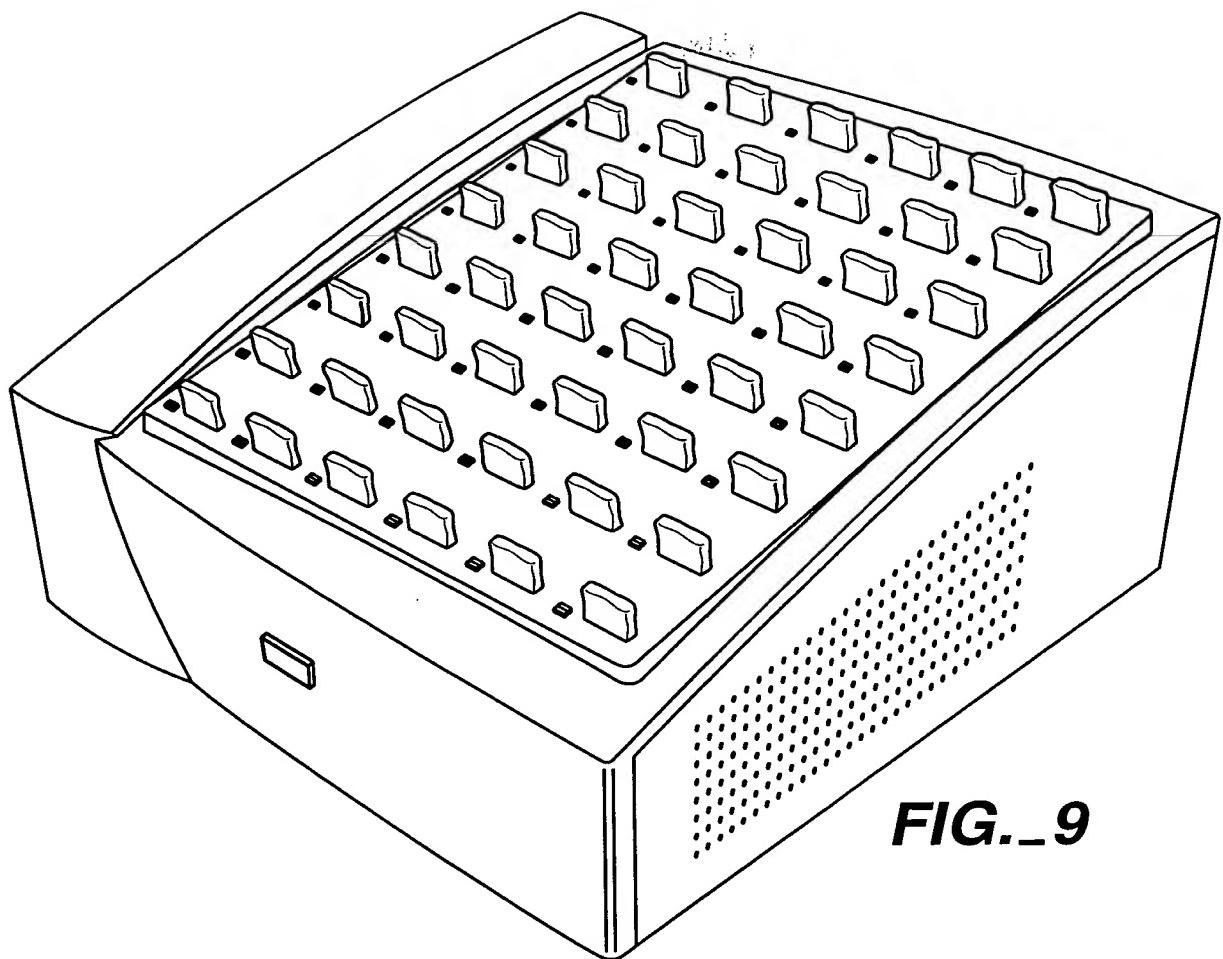


FIG._9

FIG._10A

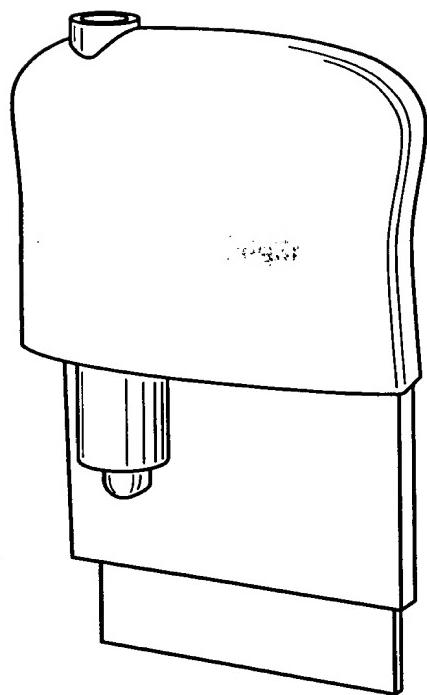
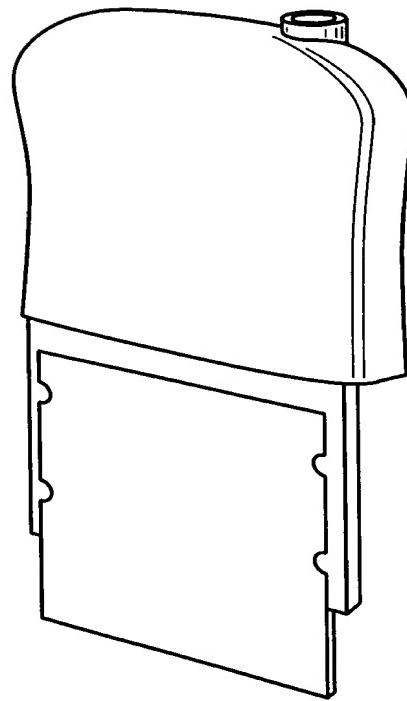


FIG._10B



- Bar coded "reference" sheet, stored in tray under unit, with bar coded protocols, bar coded well and slot id's, bar coded commands (e.g. "cancel", "done", etc.)
- Standard bar code wand (preferably with built-in decoder), housed in the tray (hence hidden when not in use)
- Serial (RS-232/485) interface (preferred), or "keyboard wedge"
- Multi-code support (Code 39, Code 128, etc.)
- Bar code on chip carrier (1 code per "8 pack"), identifying test, batch, etc.
 - Peel off labels, with same code as on carrier, with each "8 pack"

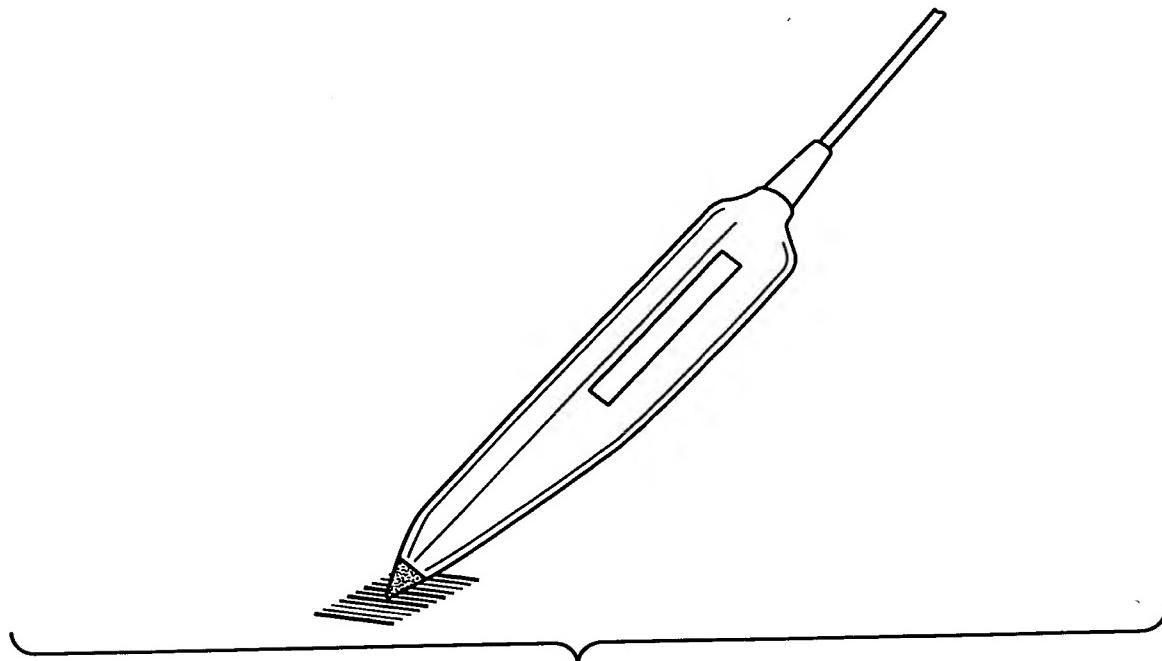


FIG._ 11

- Bar code usage scenario
 - User fills "8-pack" (all 8, or partially) from a 96 well plate, or from individual sample containers (PCR tubes, vaccutainers, etc.)
 - Pull out tray (with bar code reference sheet) and grab wand
 - Scan "start" code
 - Scan protocol code from sheet (will remain in effect until "done" is scanned)
 - Scan chip code from carrier (will remain in effect until "done" is scanned)
 - For each cartridge, user will
 - insert the cartridge in an open slot. Unit senses new chip automatically
 - scan the sample ID by either
 - scanning 96 well plate bar code from plate and well code from sheet
 - or scanning unique sample ID from container
 - or scanning "no ID" from reference sheet
 - Scan "done" code. The protocol can now be started on these cartridges

FIG._ 12

- Bar code concept benefits
 - No keyboard entry (all-routine setup can be entered via bar coding)
 - All routine entries accomplished while in front of unit (no going back & forth between PC & Hydra)
 - All bar code entries done from small, flat surface in front of unit
 - No need to label each chip or each slot (which would compromise appearance)
 - Uses small unobtrusive bar code wand, hidden when not in use
 - Is flexible with respect to sample container (tube, 96 well plate, etc.), chip usage (by row of 8, or by individual chip), and lab bar coding method

FIG._ 13

FIG._ 14A

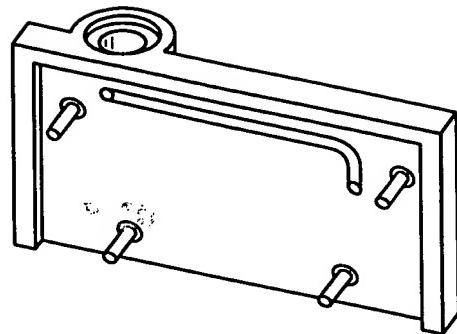


FIG._ 14B

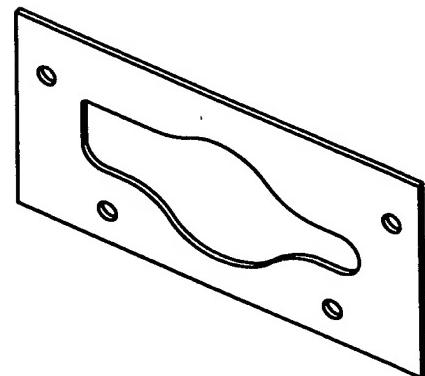


FIG._ 14C

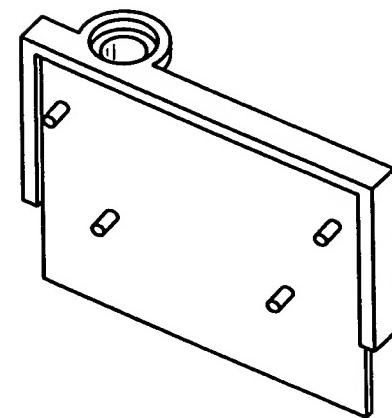
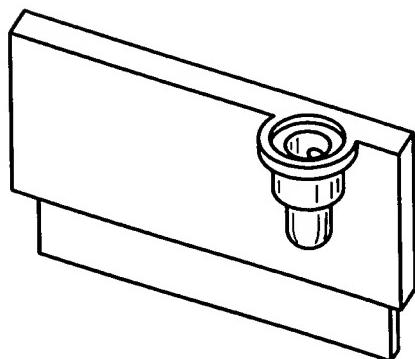


FIG._ 14D



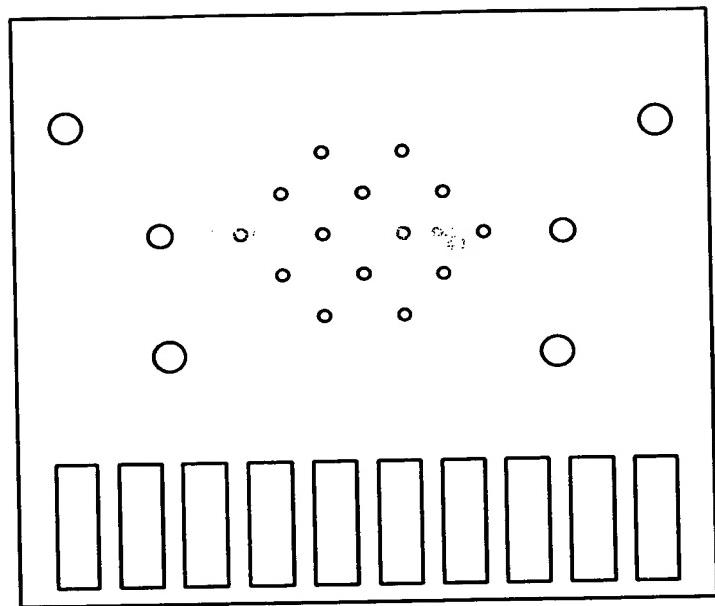


FIG._14E

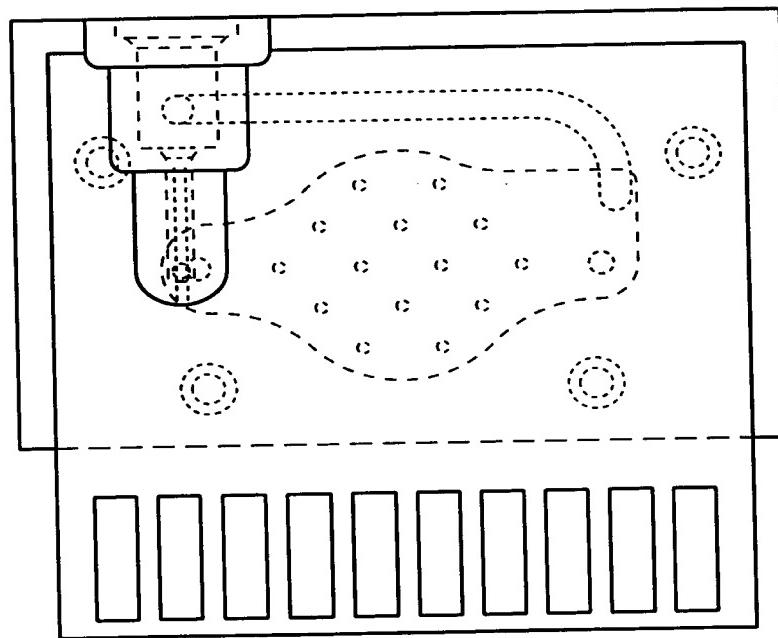


FIG._14F

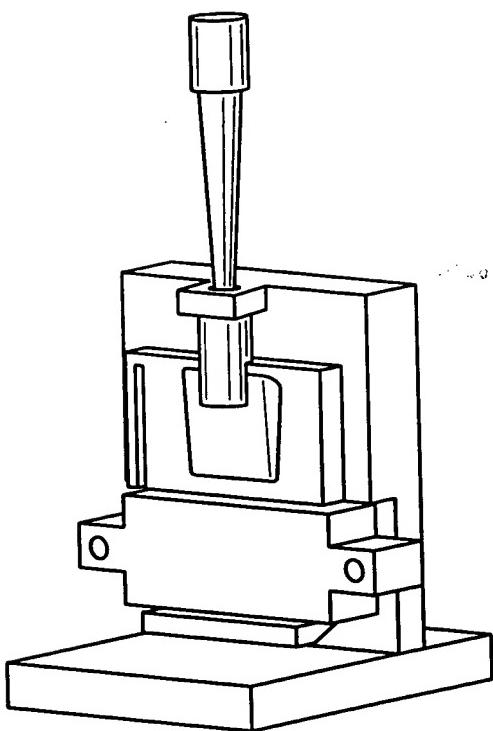


FIG._15A

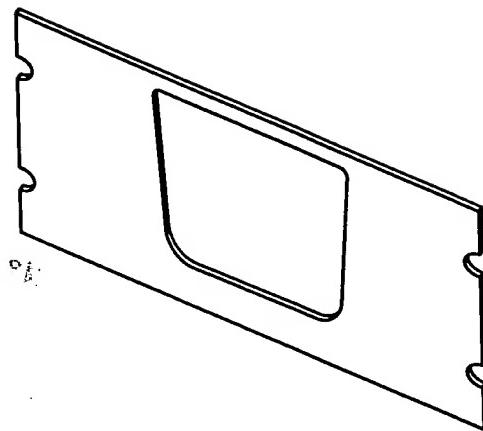


FIG._15B

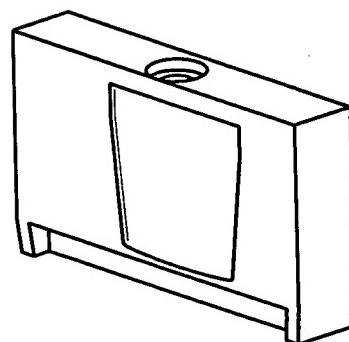


FIG._15C

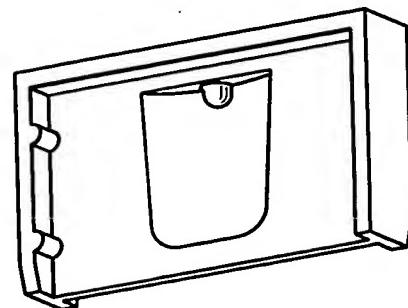


FIG._15D

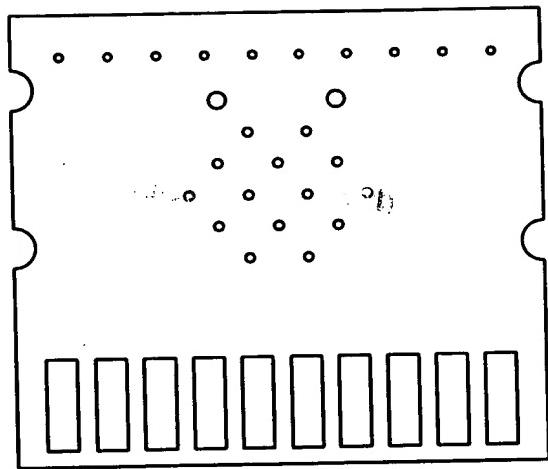


FIG._15E

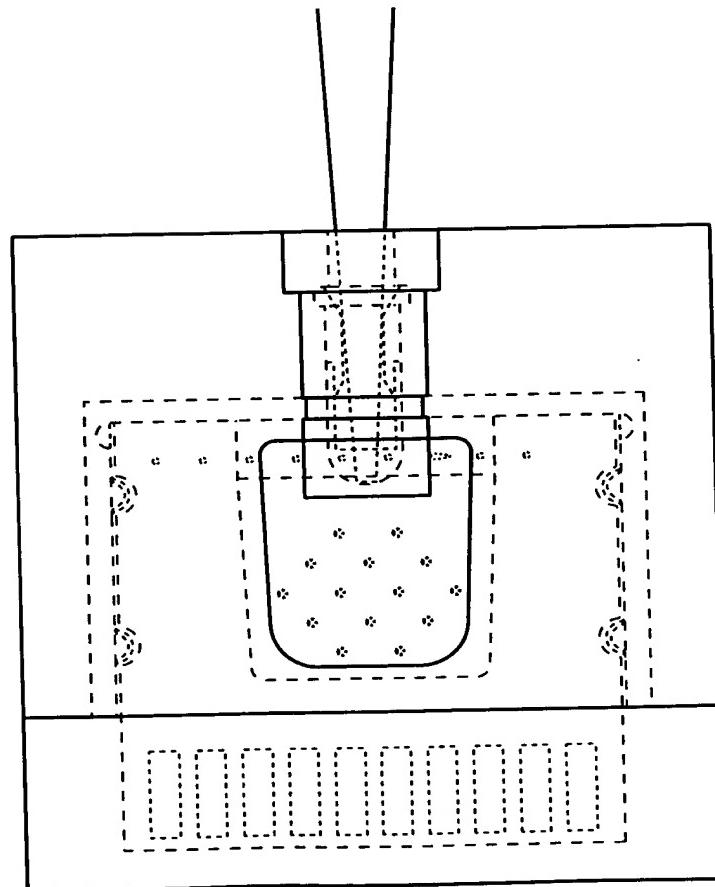


FIG._15F

A Sine Wave And Its Corresponding Vector Notation

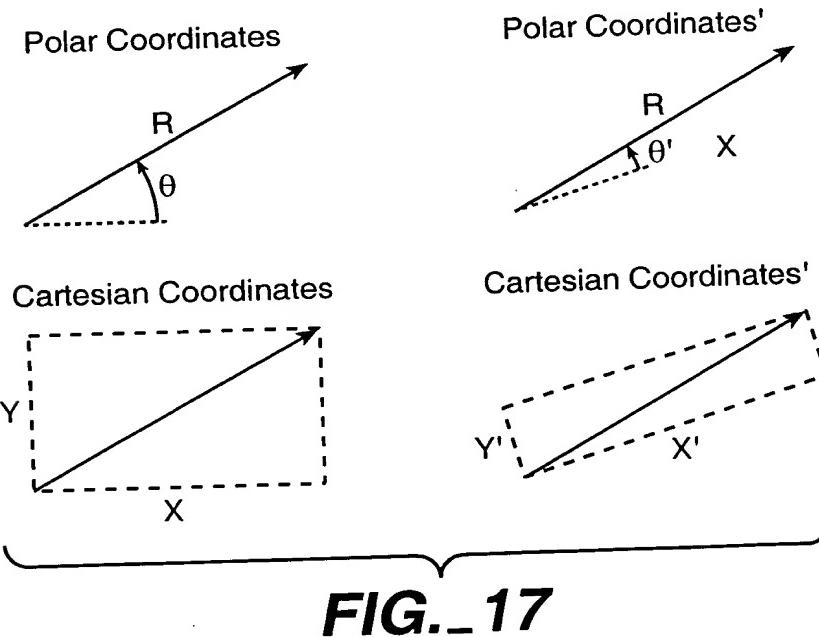
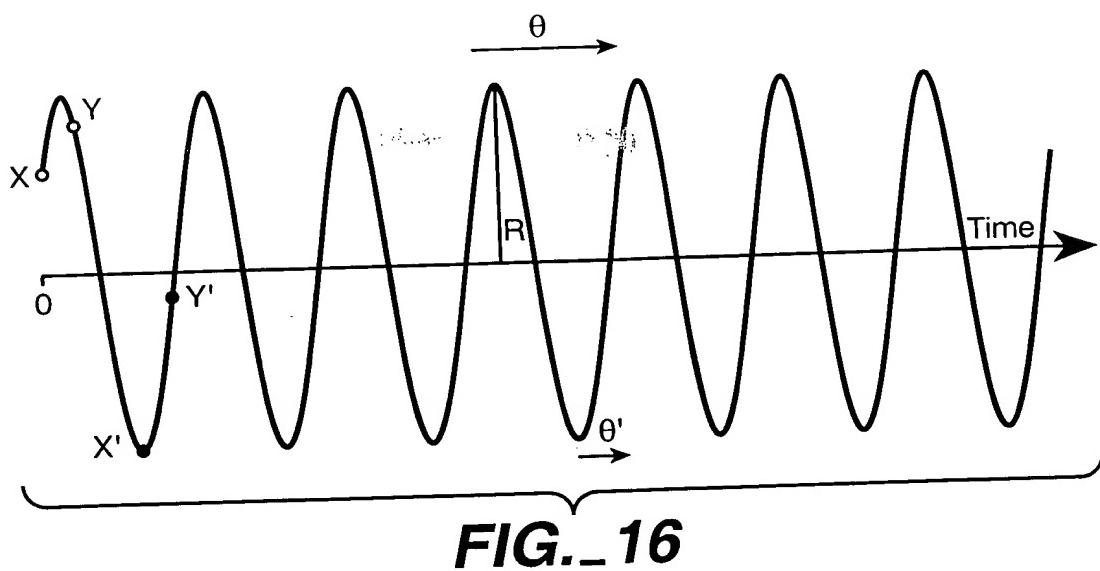


FIG.. 18

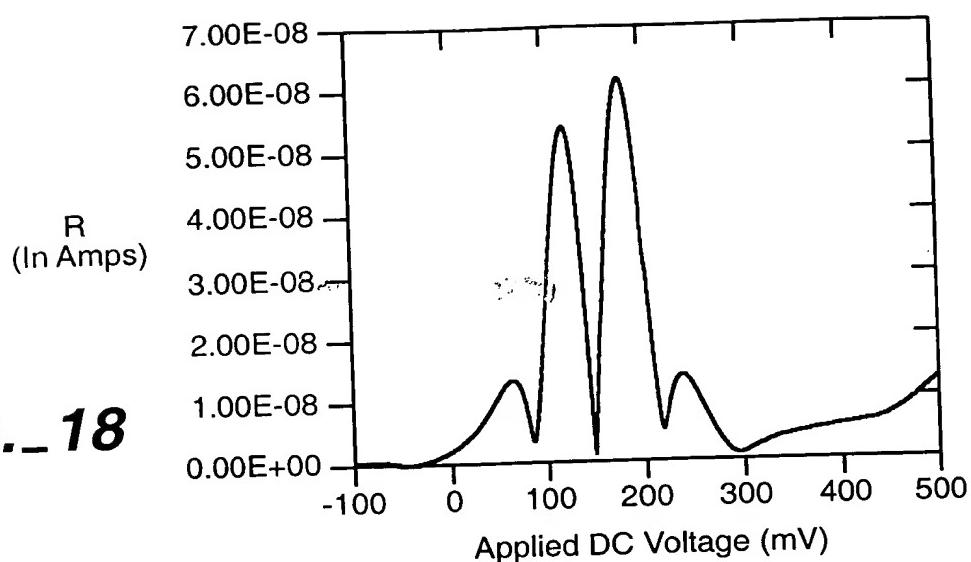


FIG.. 19

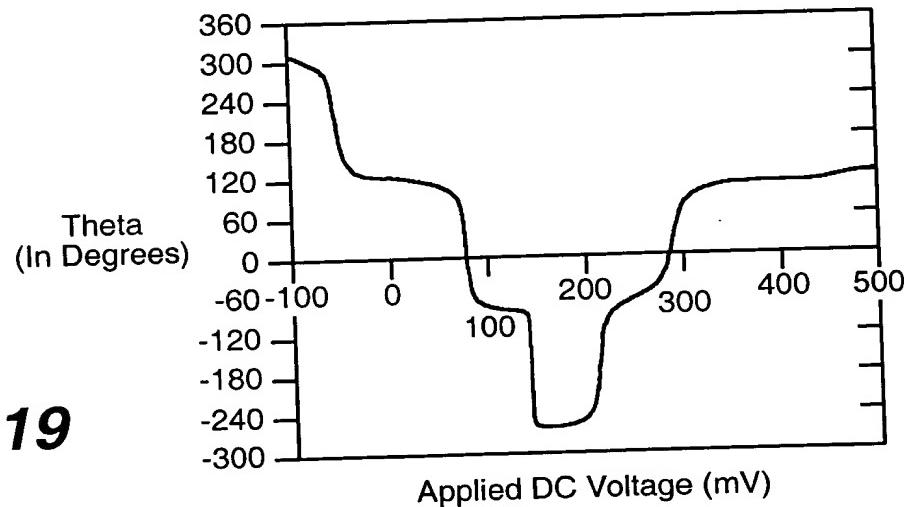


FIG.. 20

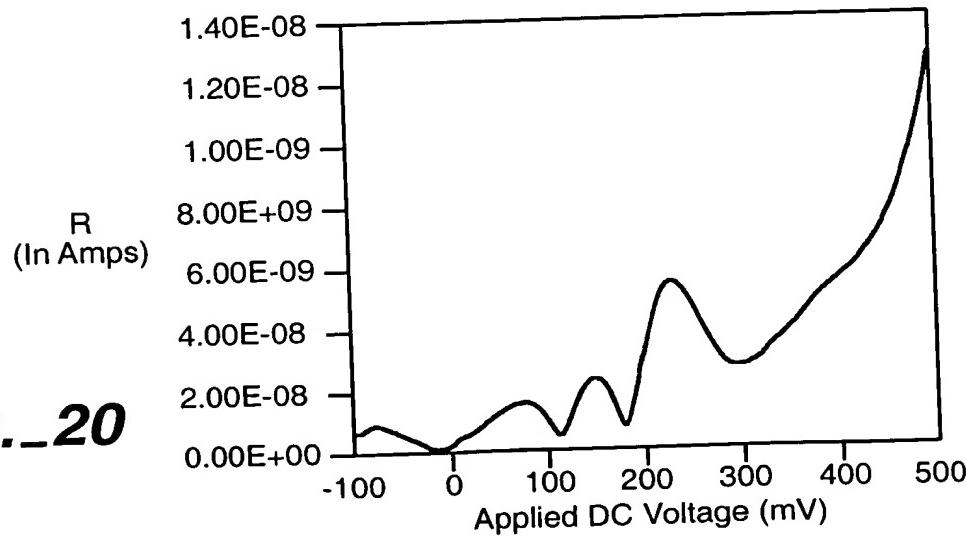


FIG._21

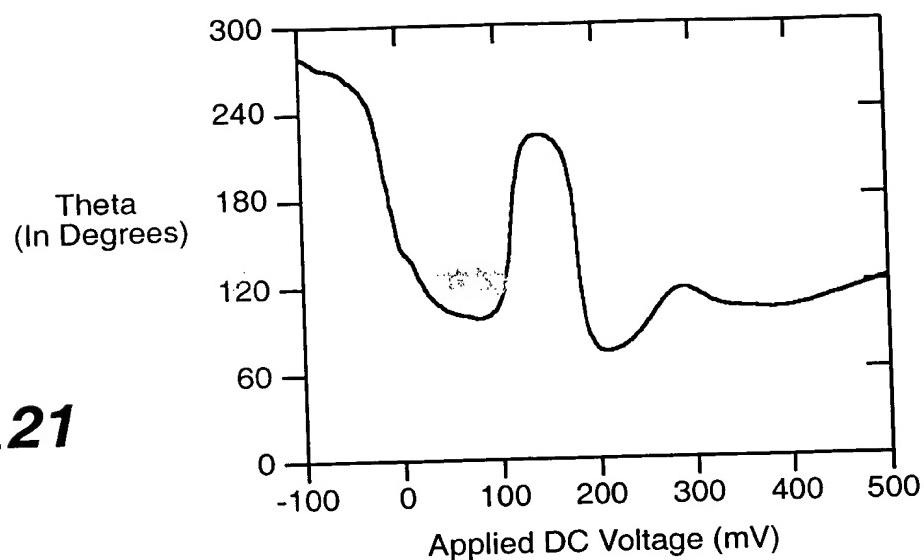


FIG._22

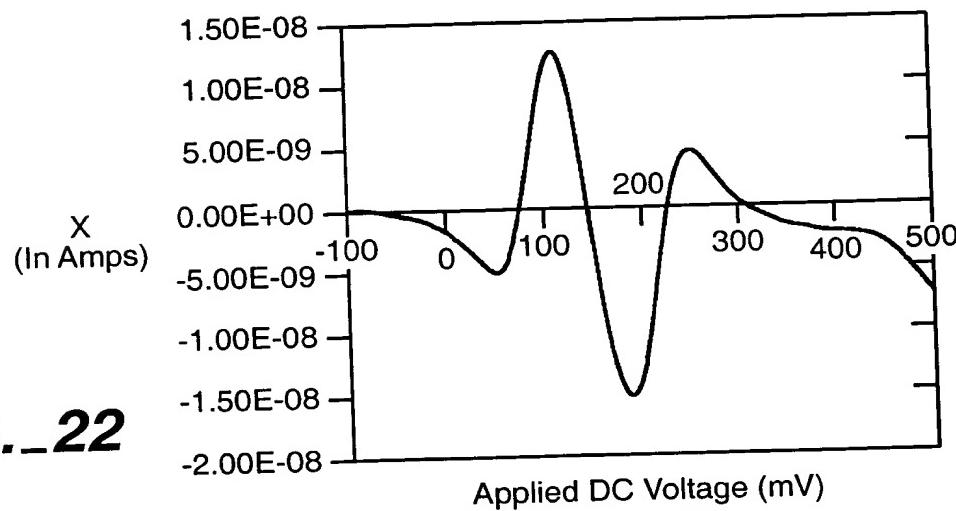


FIG._23

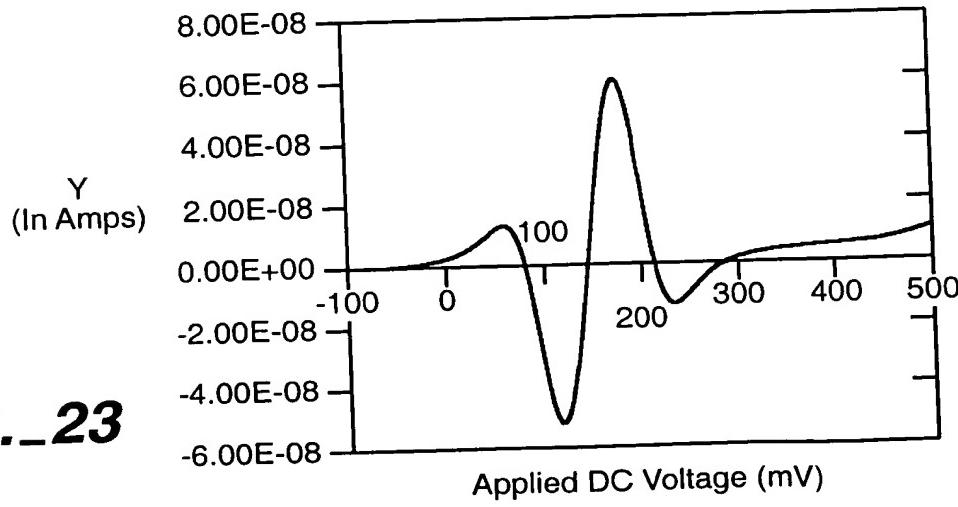


FIG._24

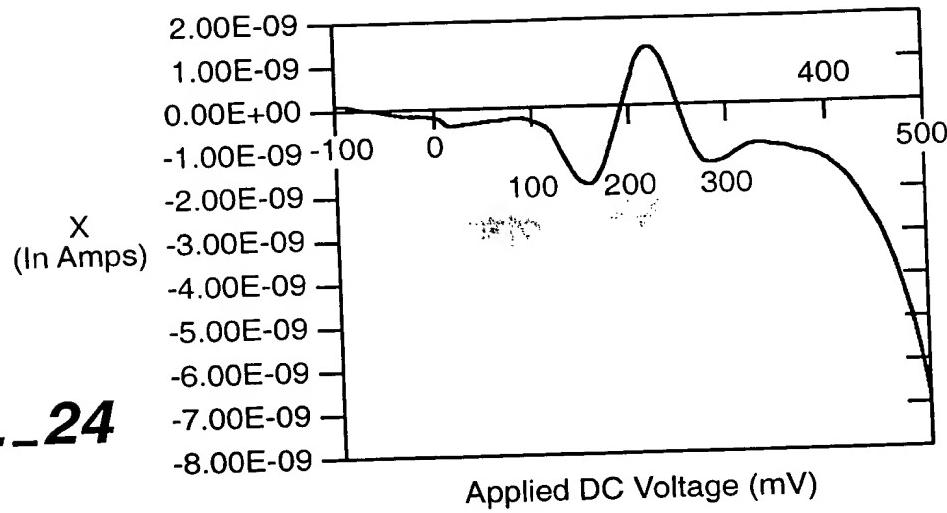
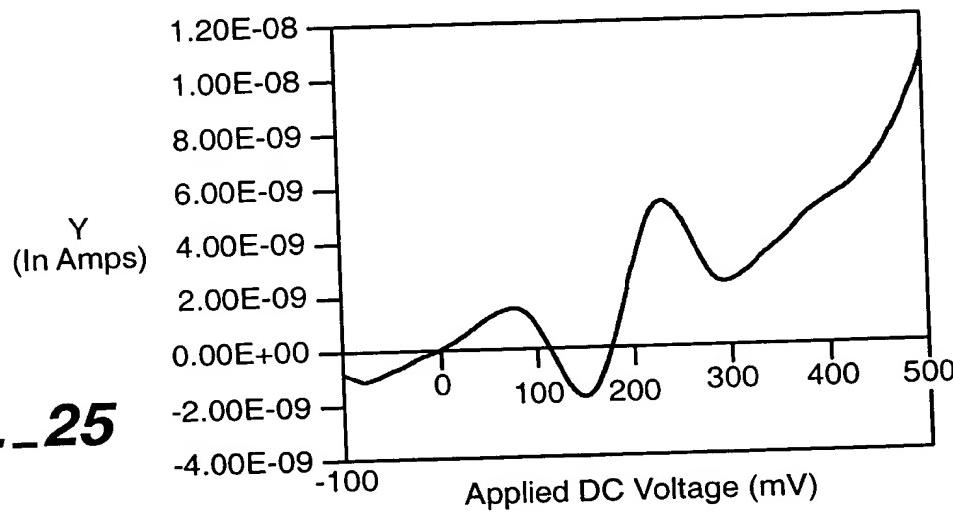


FIG._25



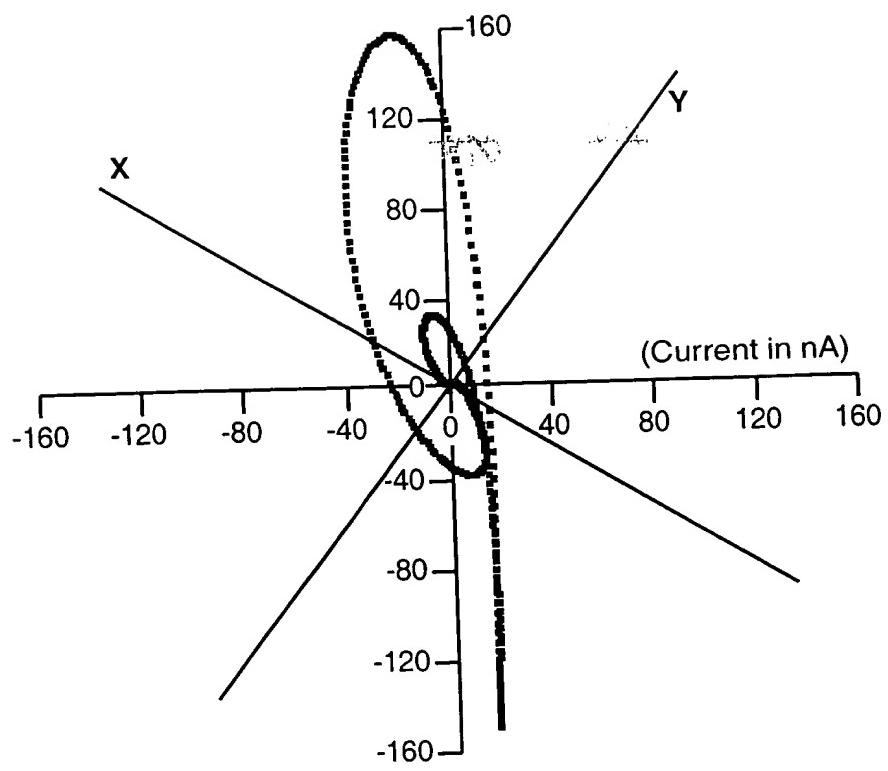


FIG._26

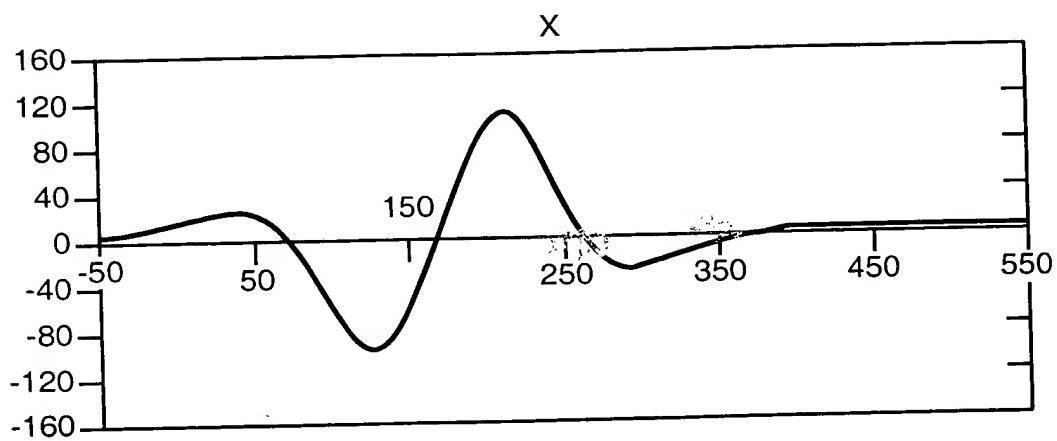


FIG..27

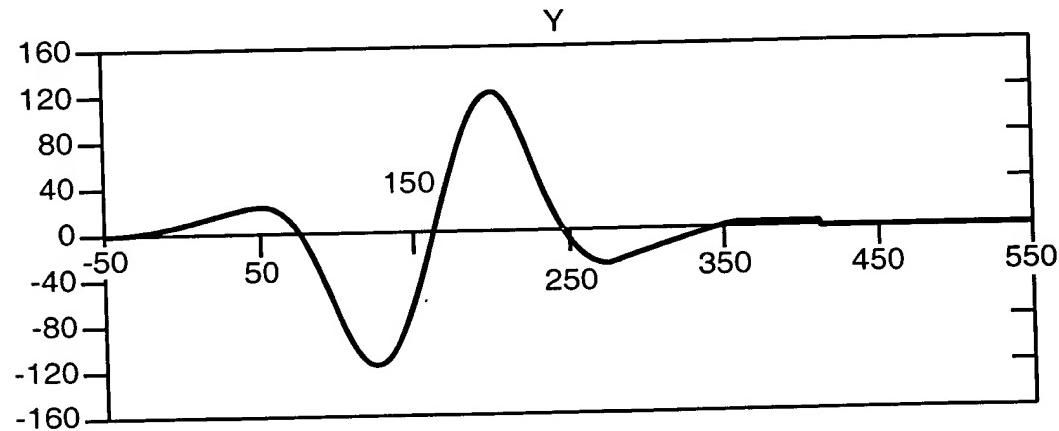


FIG..28

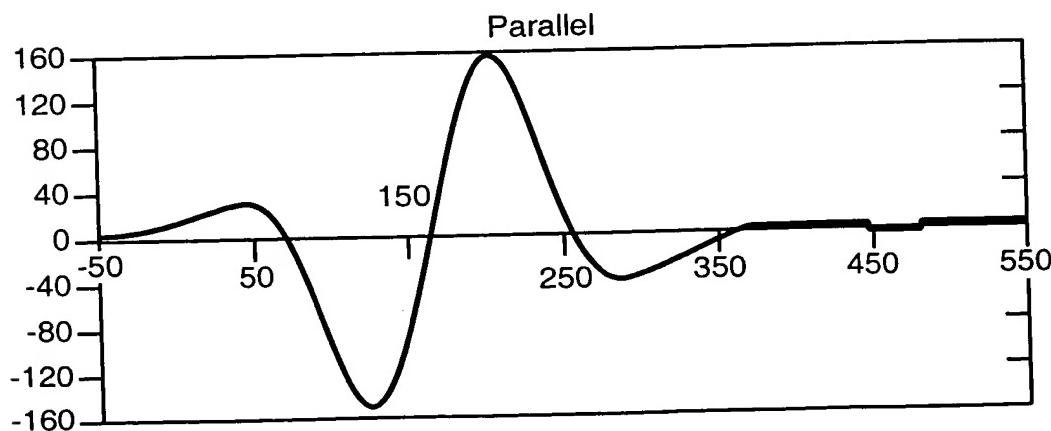


FIG..29

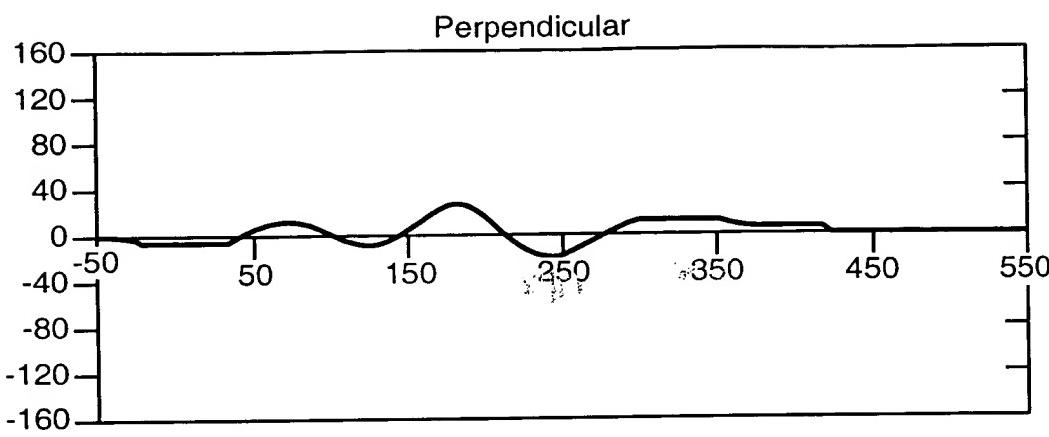


FIG._30

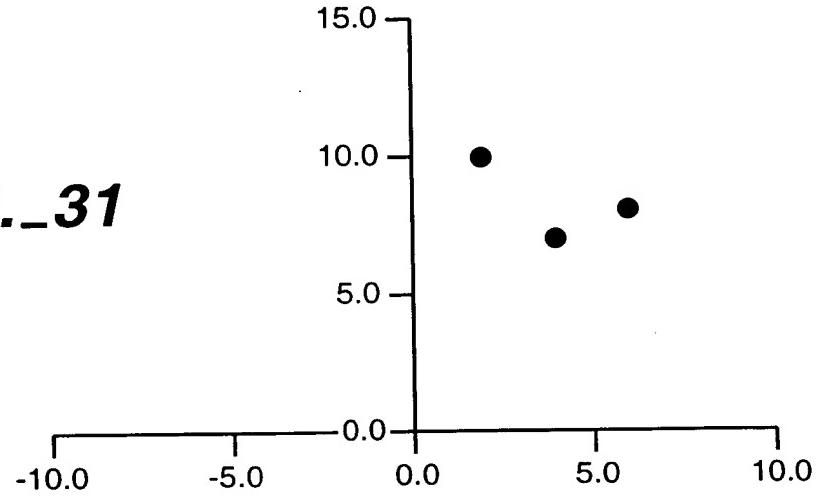


FIG._31

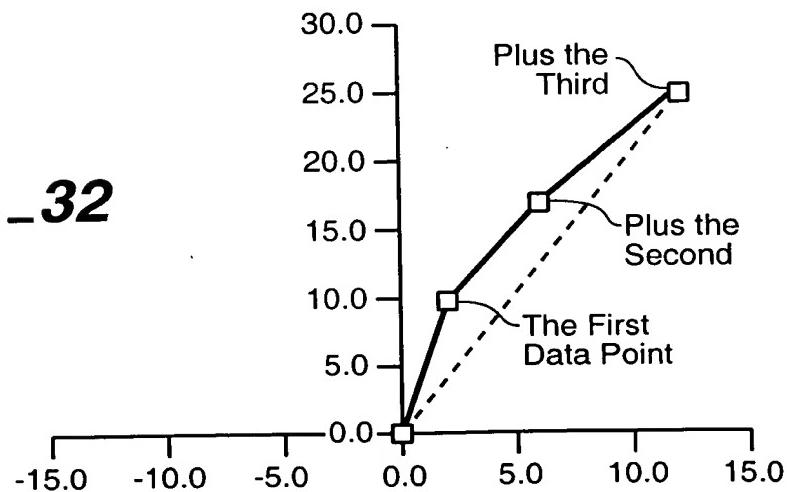


FIG._32

FIG._33

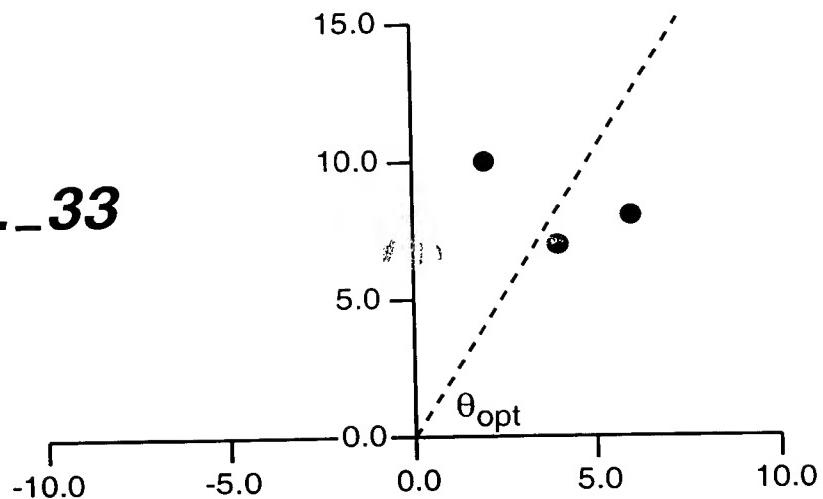


FIG._34

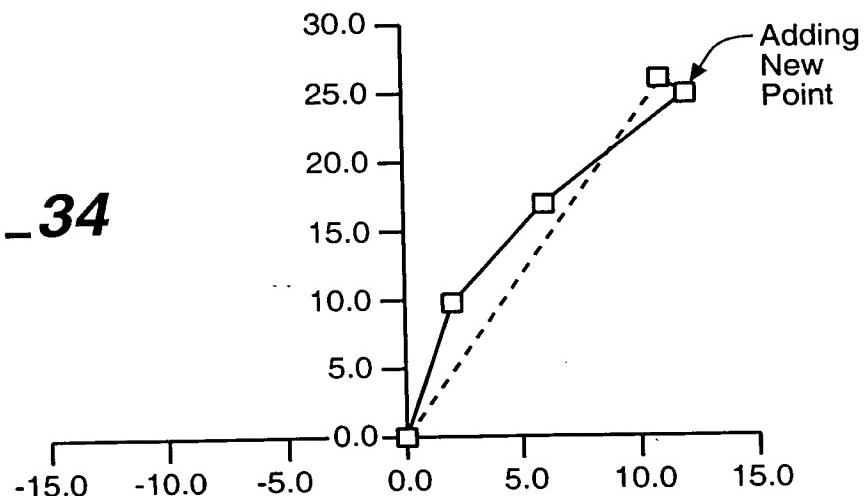
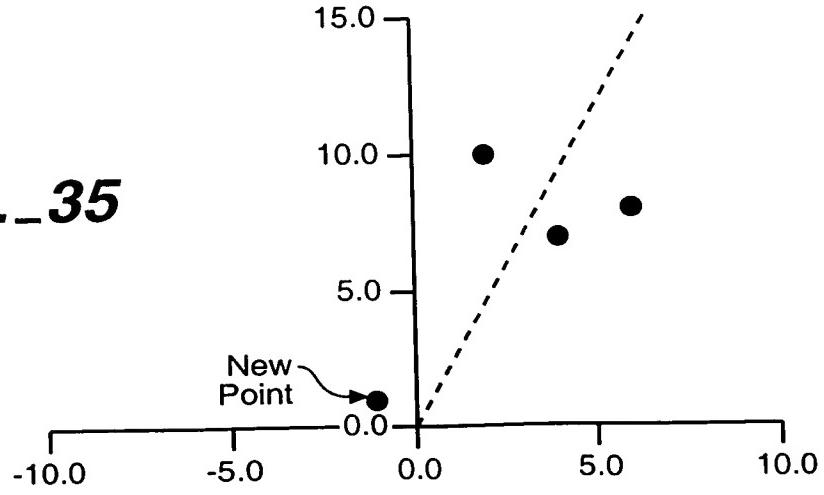


FIG._35



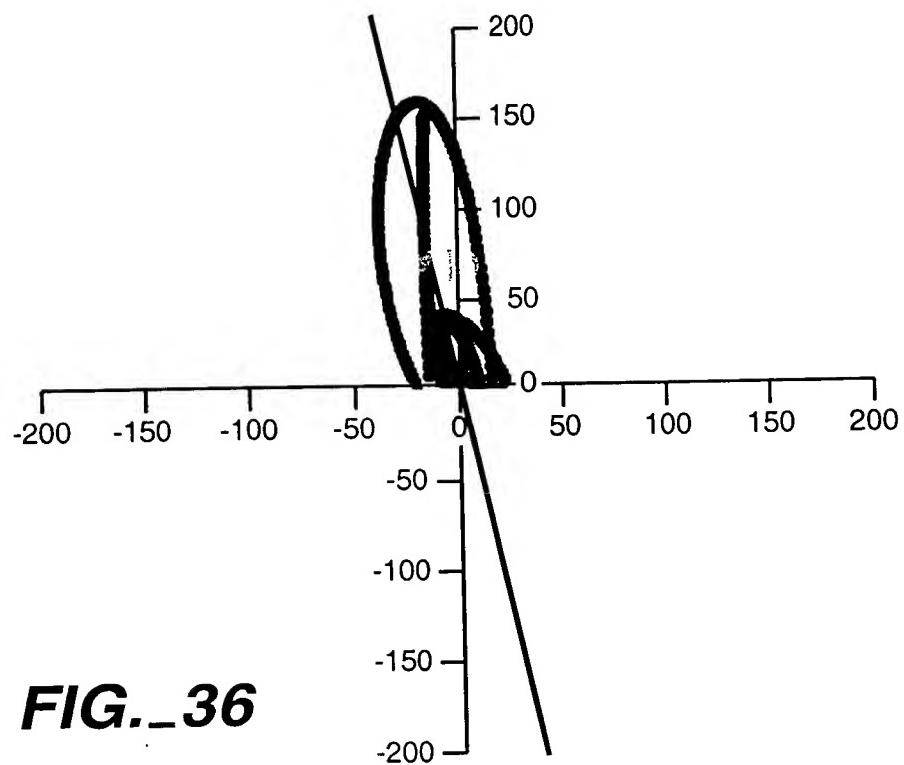


FIG._36

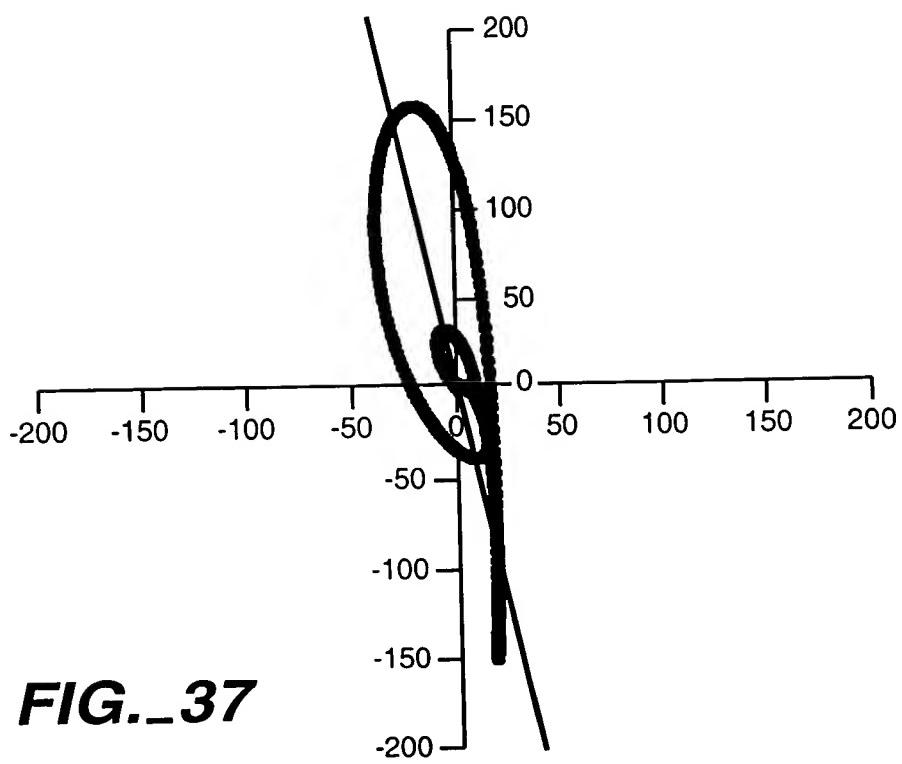


FIG._37

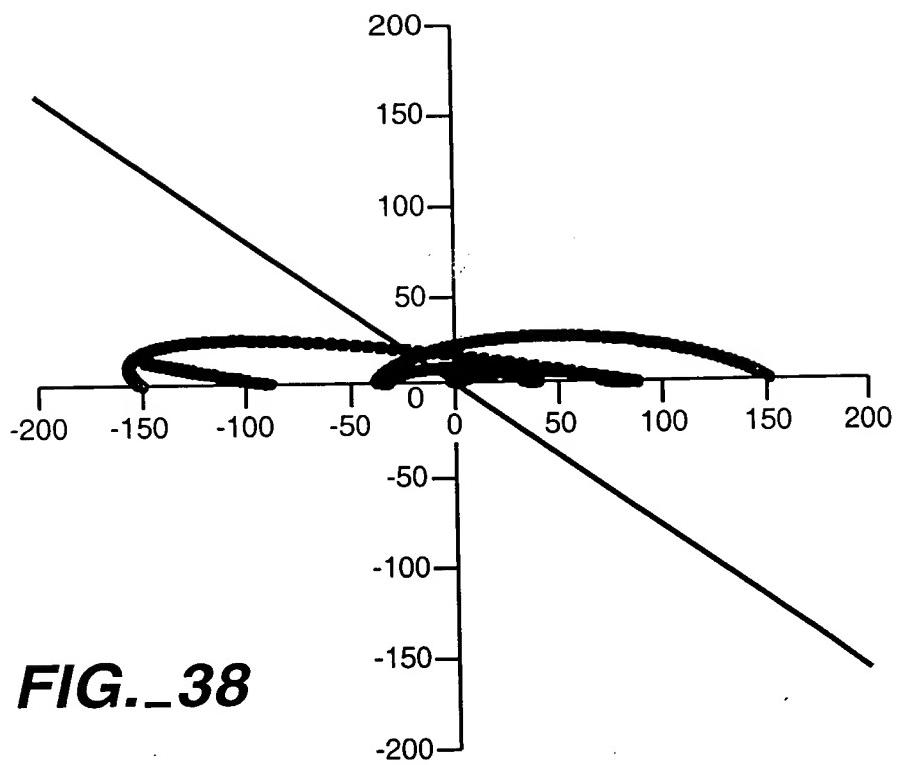


FIG._38

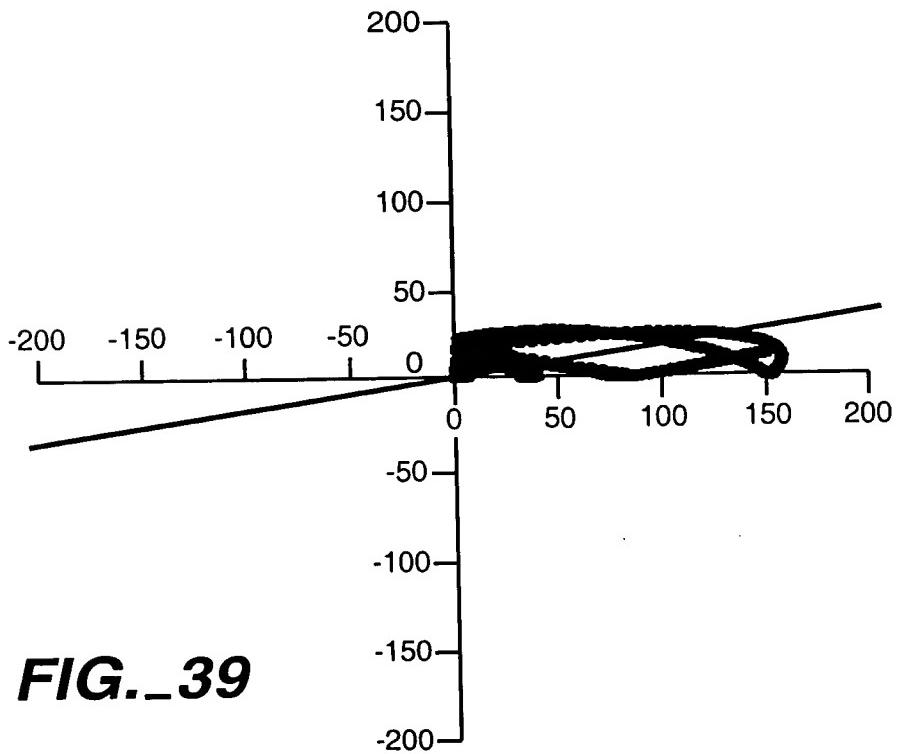


FIG._39

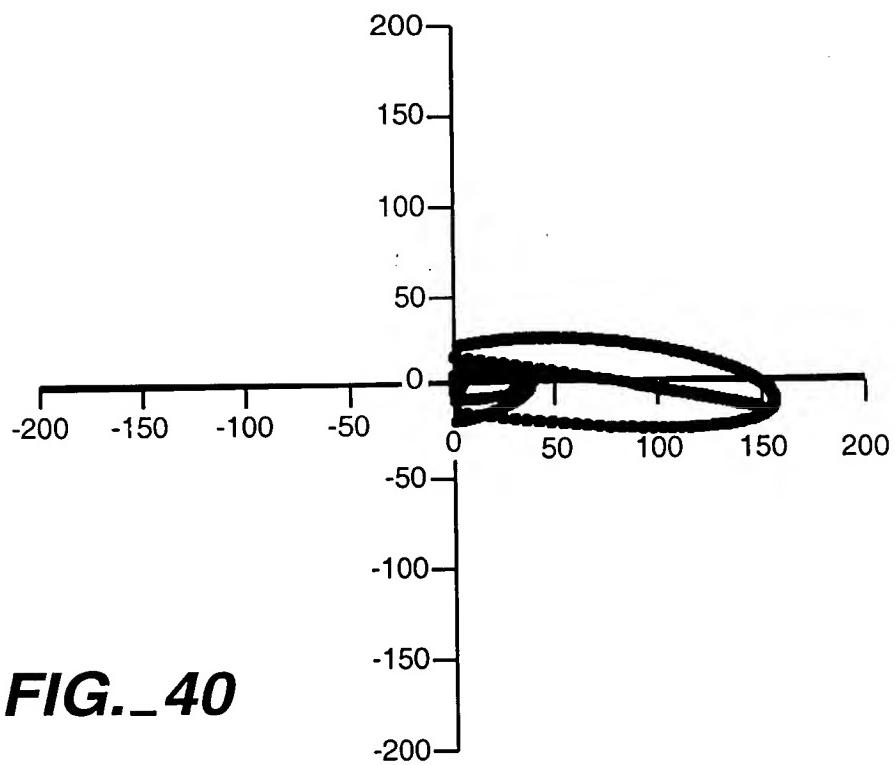


FIG._40

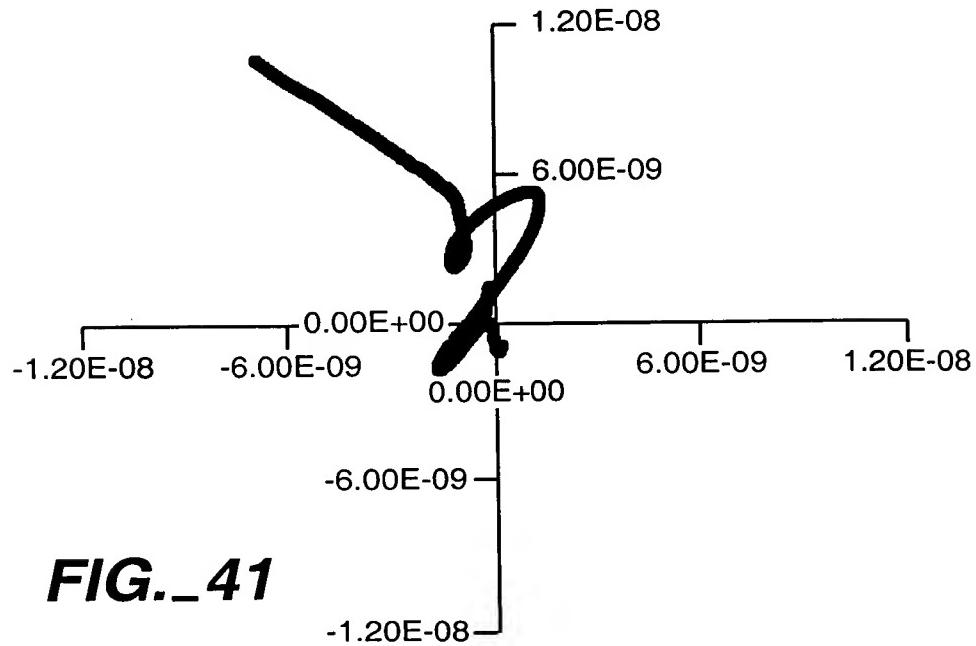
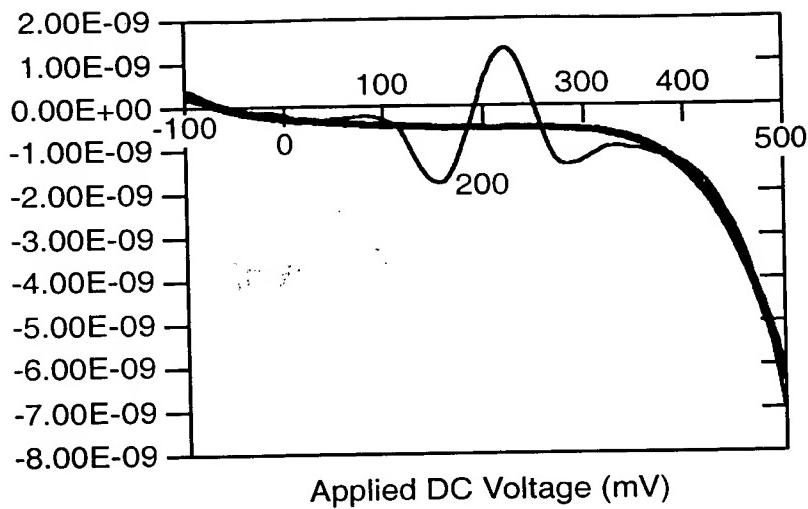


FIG._41

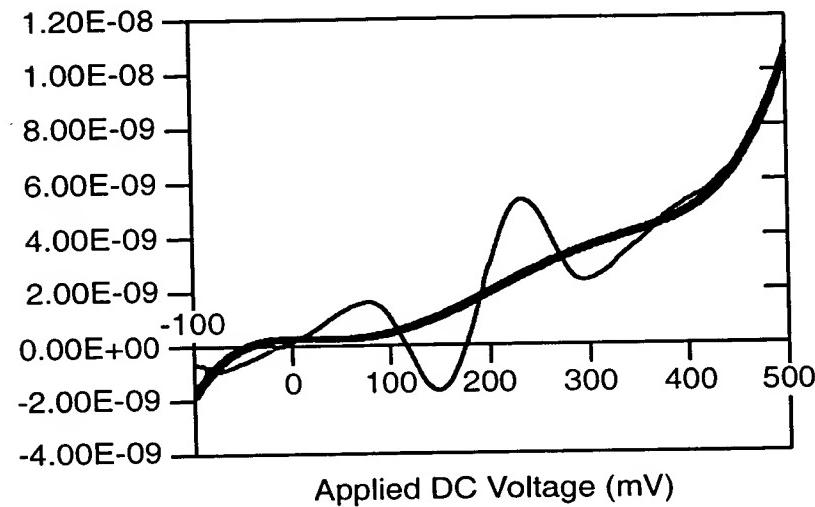
Scan Viewed
Along
0 Degrees

FIG._42



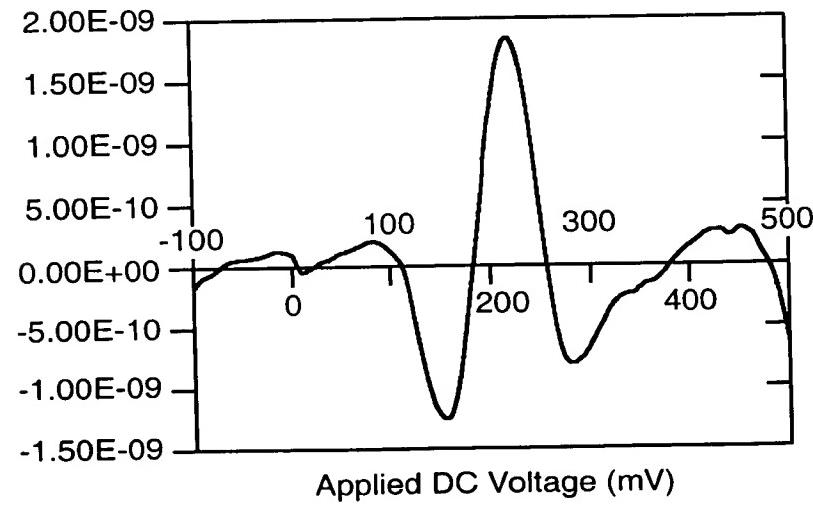
Scan Viewed
Along
0 Degrees

FIG._43



0 Deg. -
5th Order
Polynomial

FIG._44



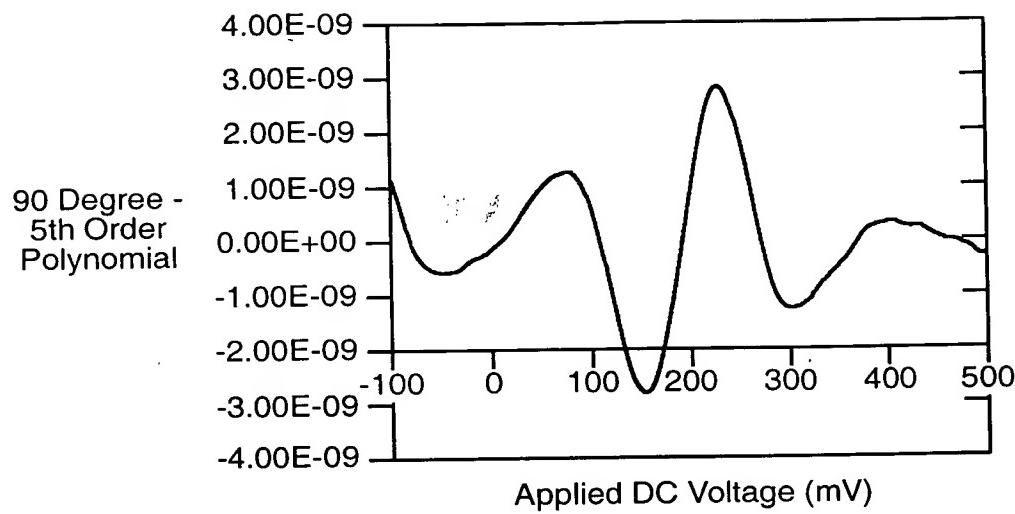


FIG._45

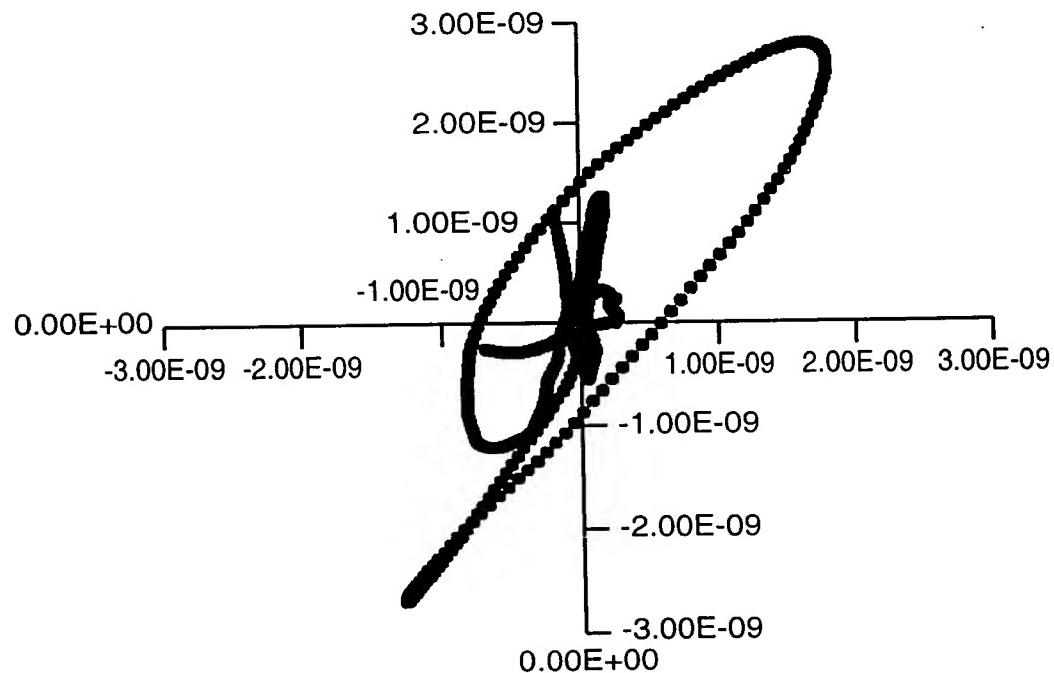


FIG._46

100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500

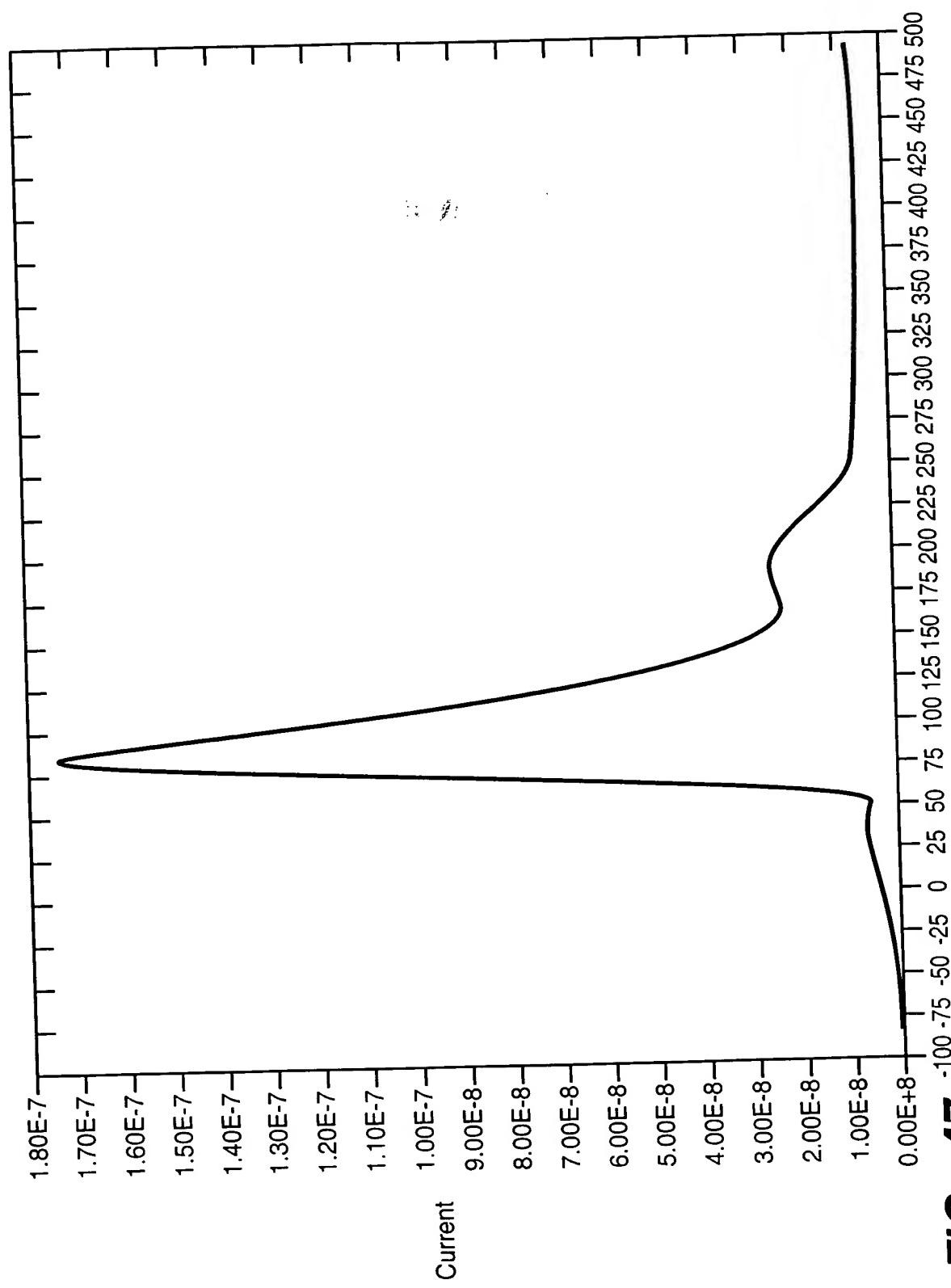


FIG. 47

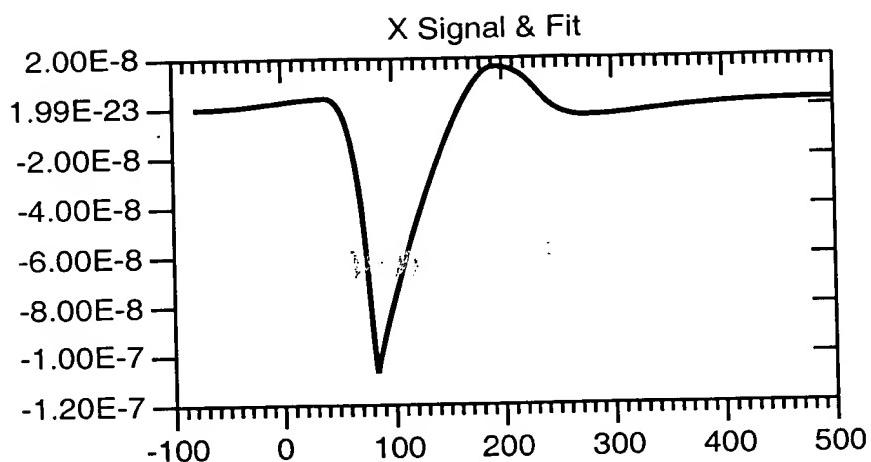


FIG._48

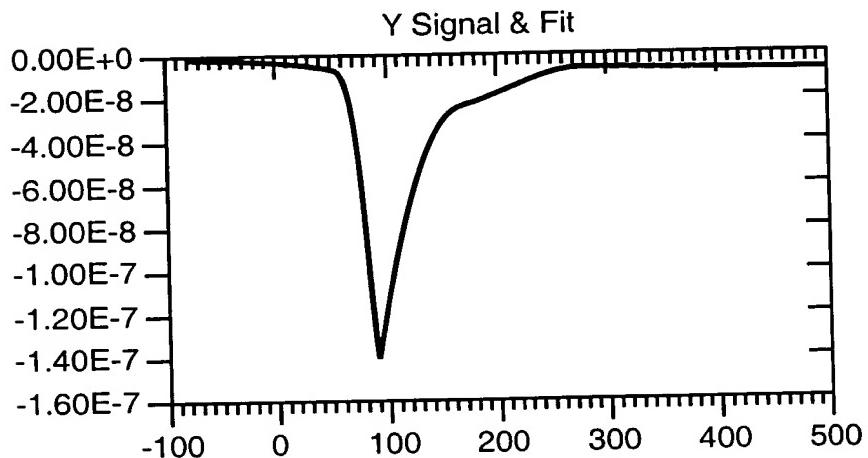


FIG._49

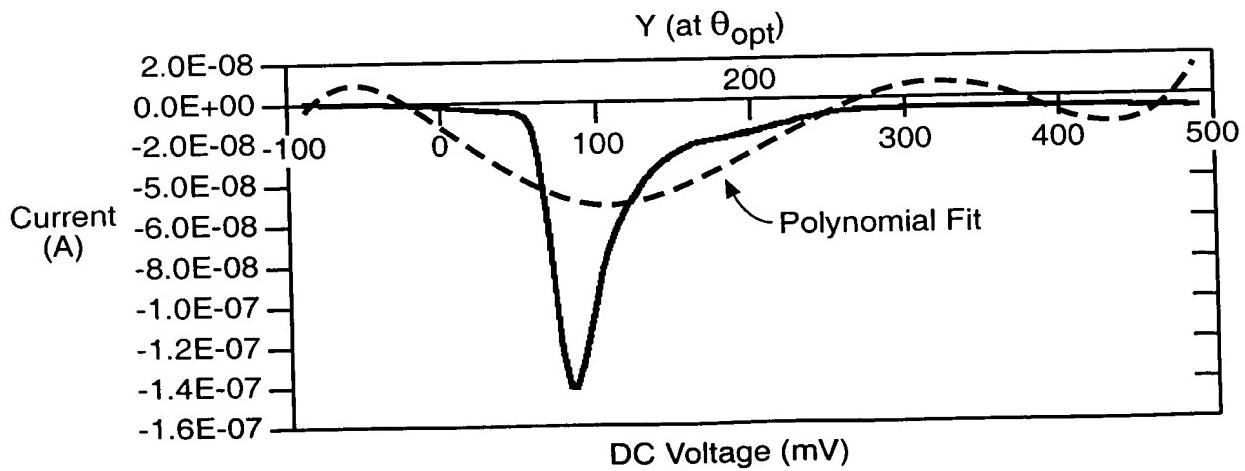


FIG._50

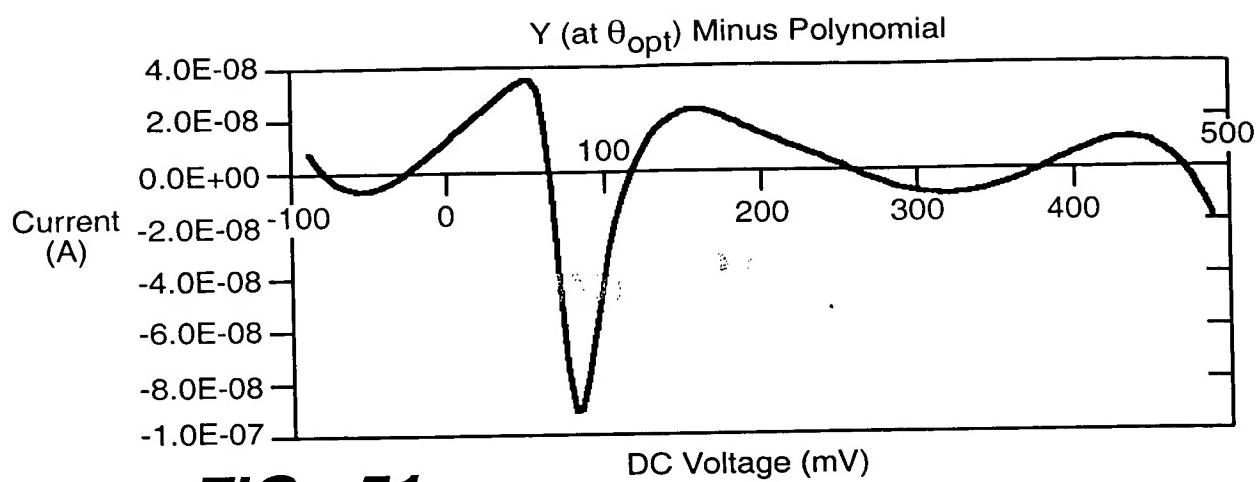


FIG._51

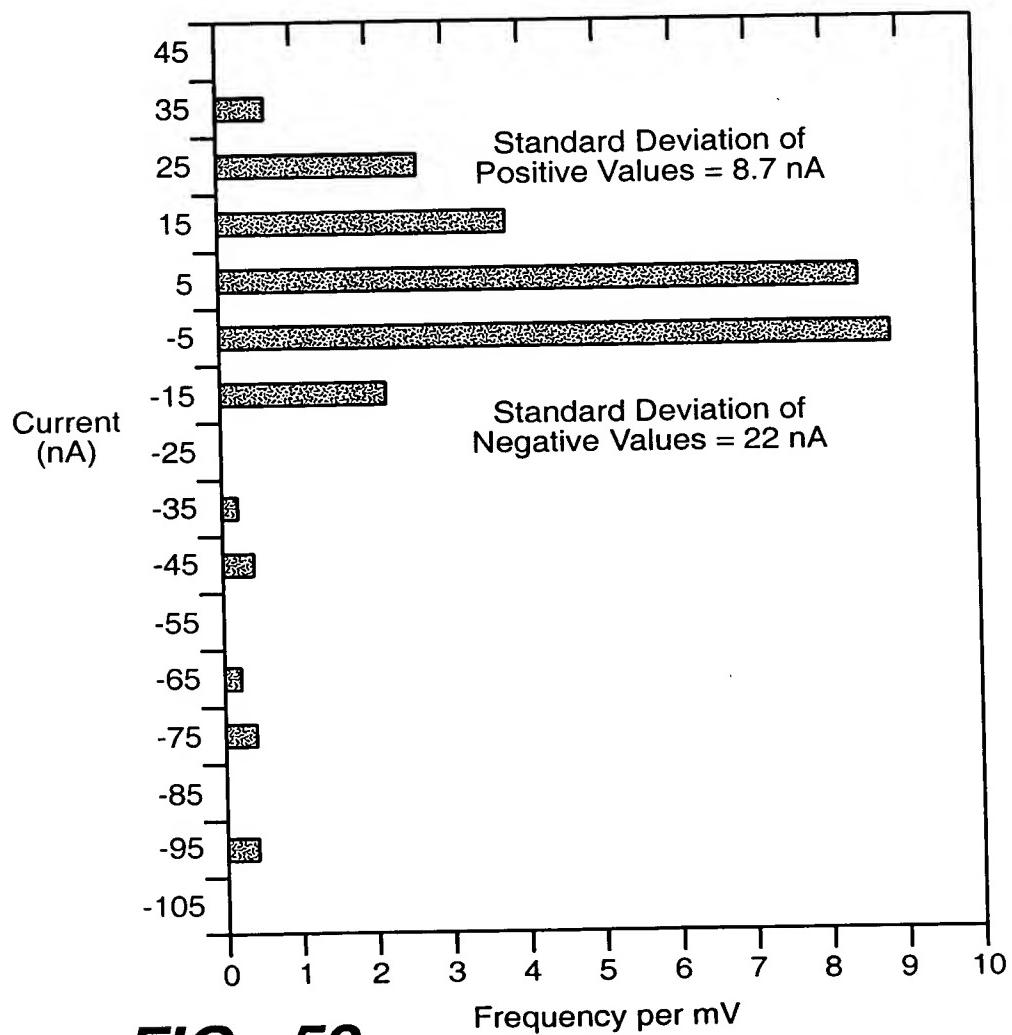


FIG._52

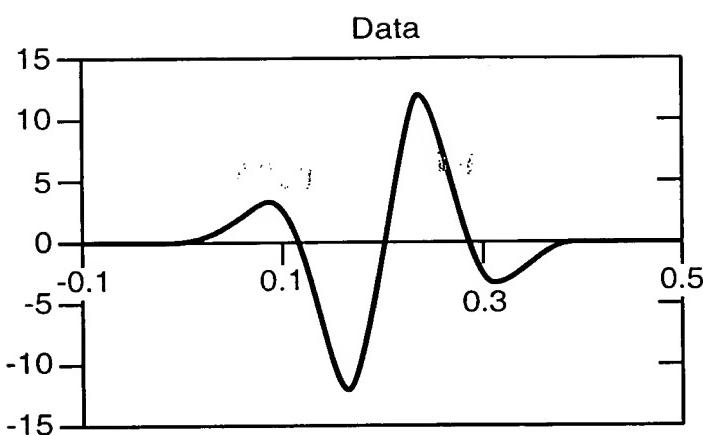


FIG._53

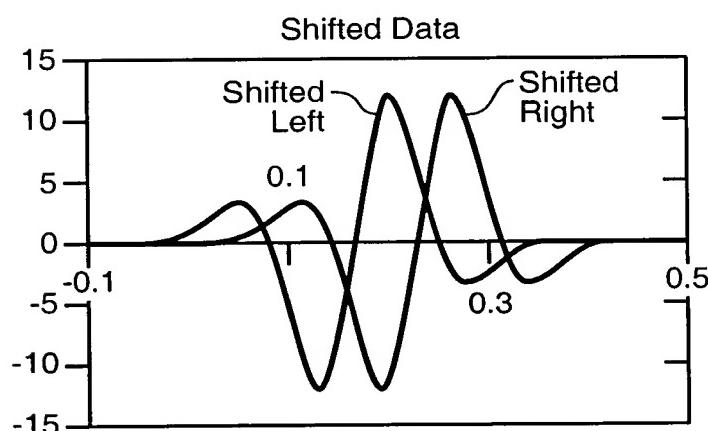


FIG._54

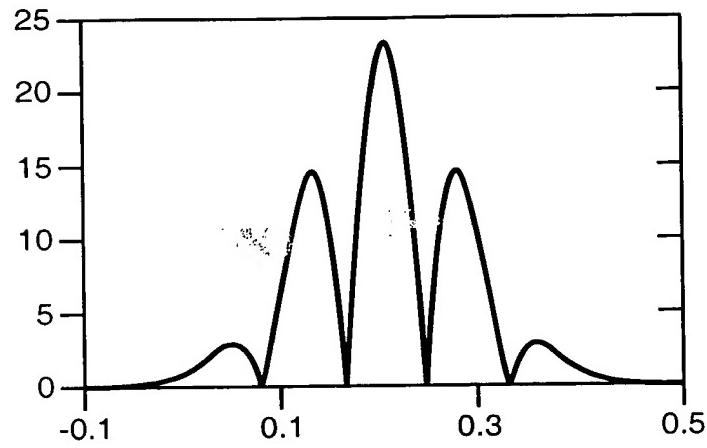


FIG._55

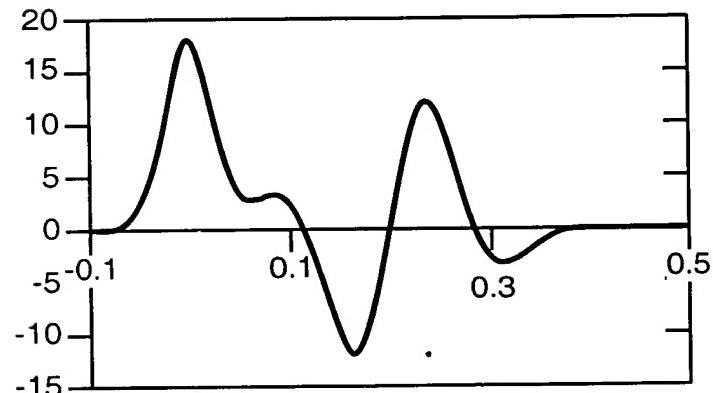


FIG._56

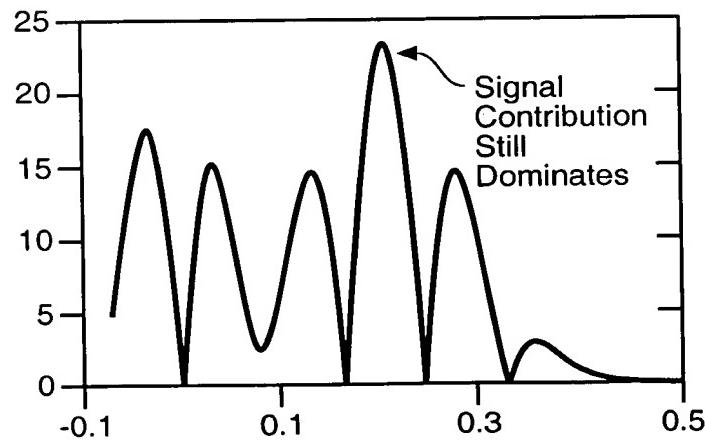


FIG._57

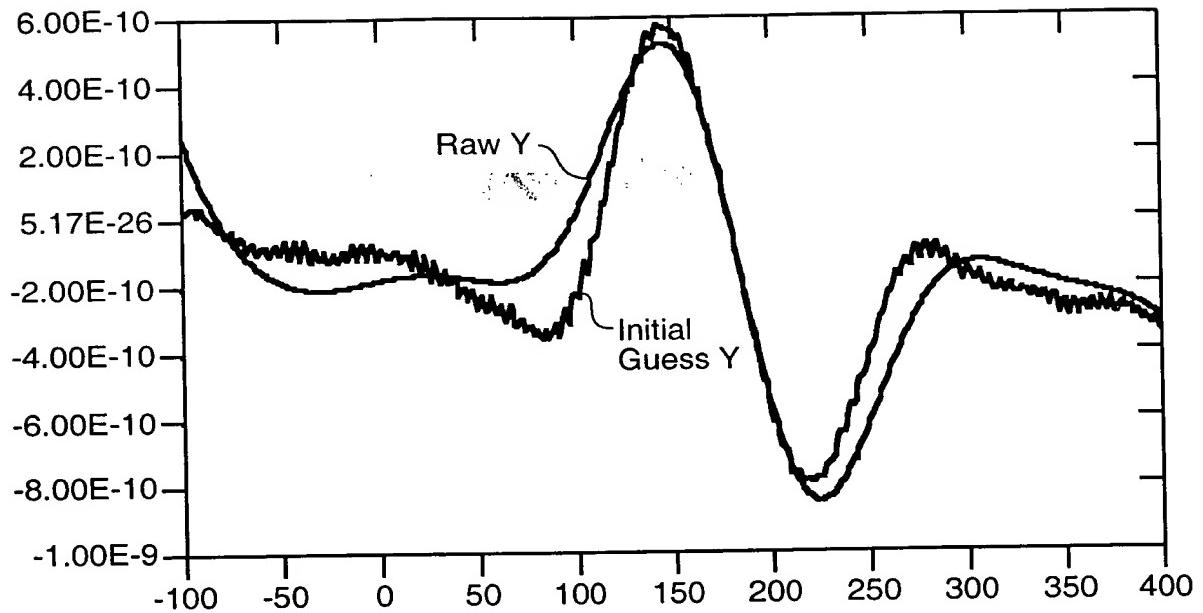


FIG._58

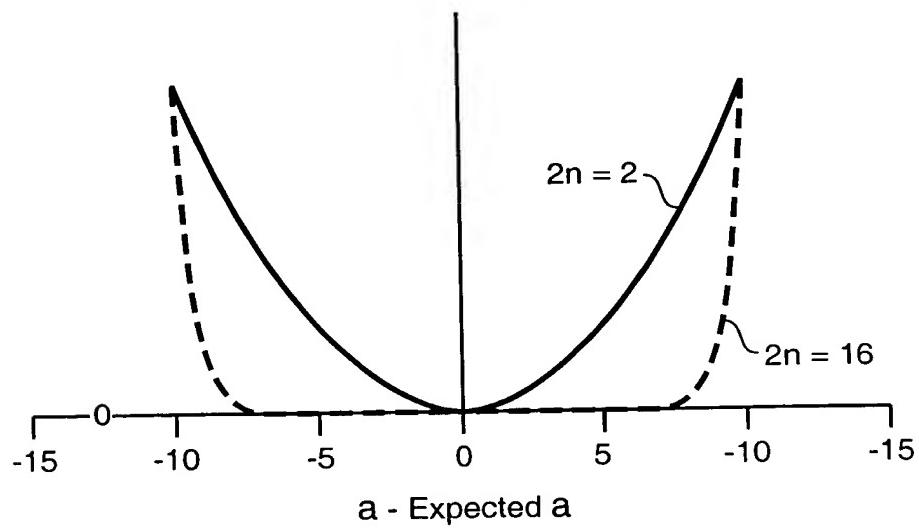


FIG._59

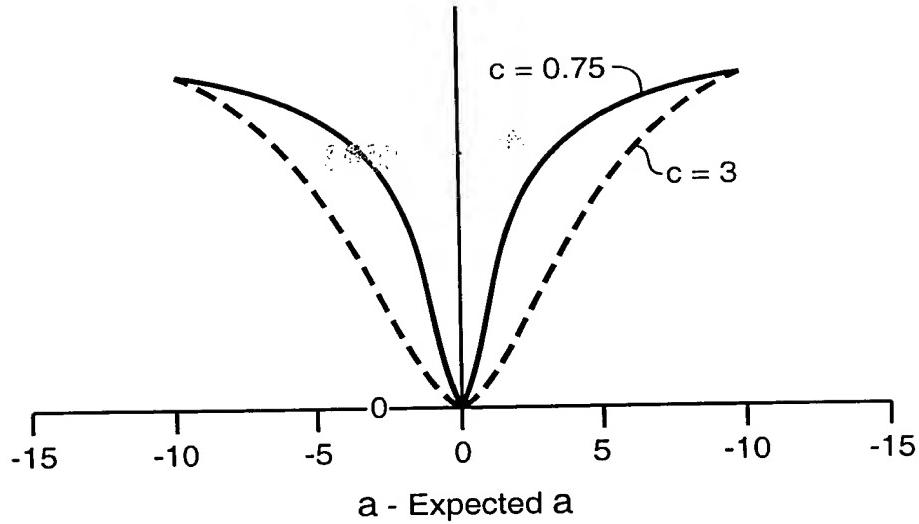


FIG._60

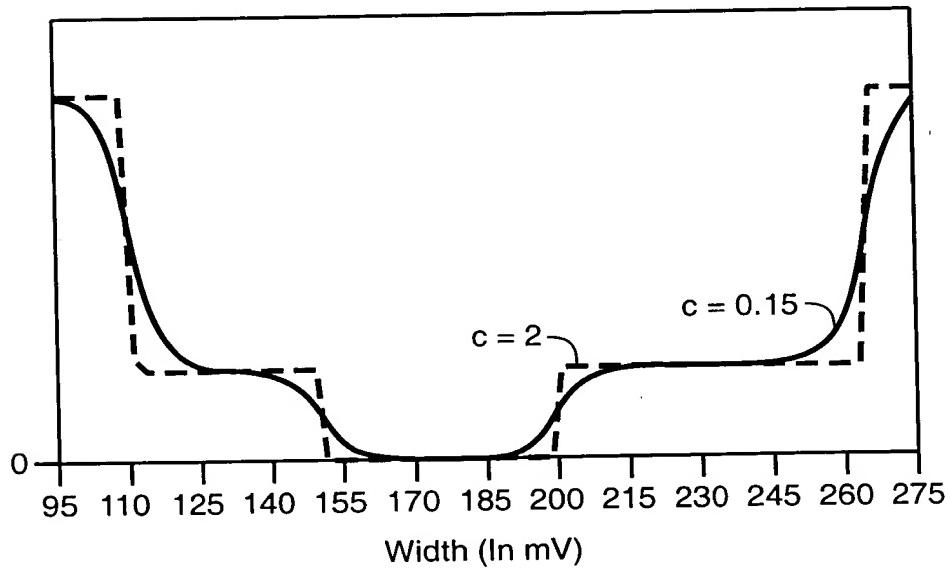


FIG._61

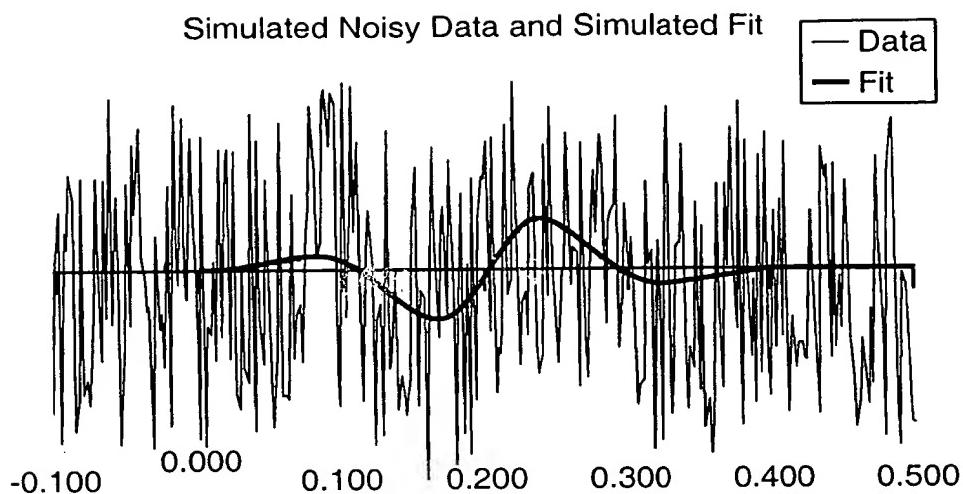


FIG._62

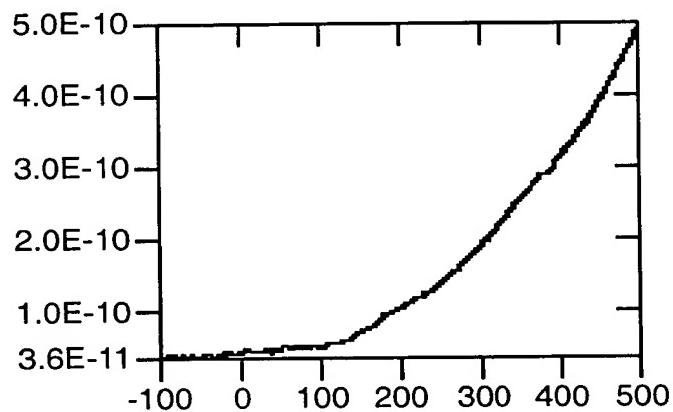


FIG._63

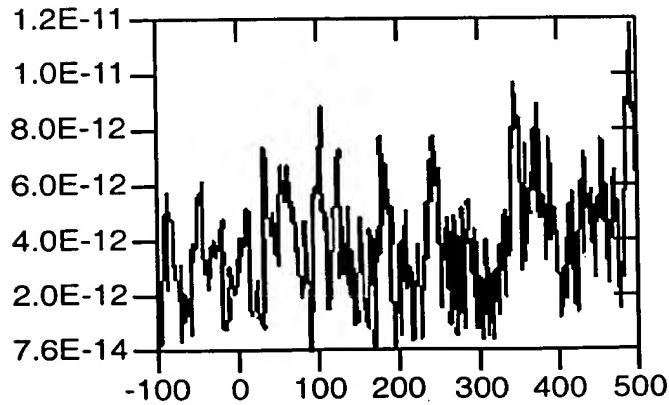


FIG._64

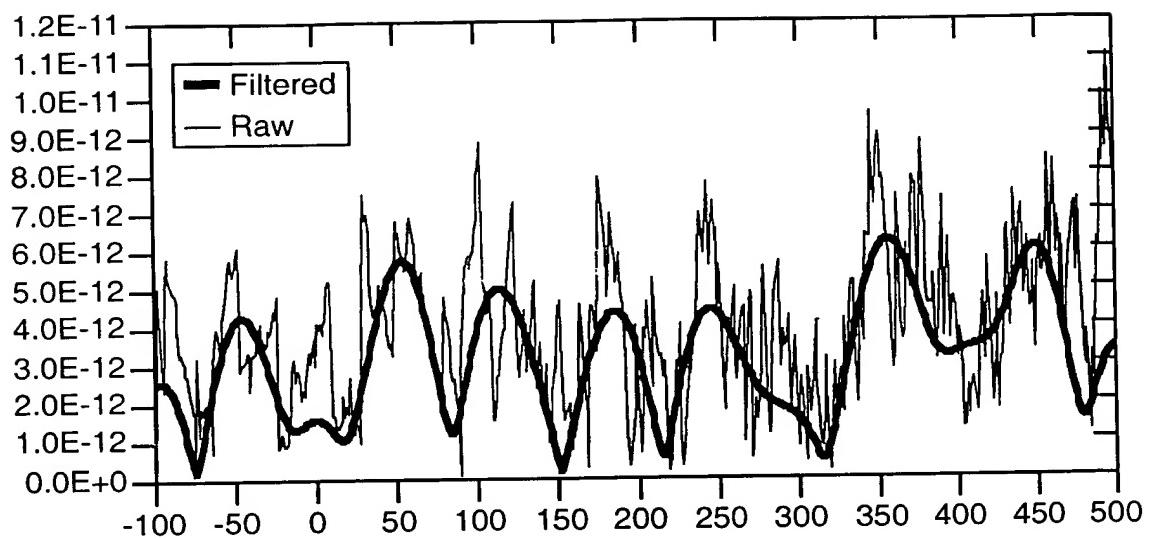


FIG._65

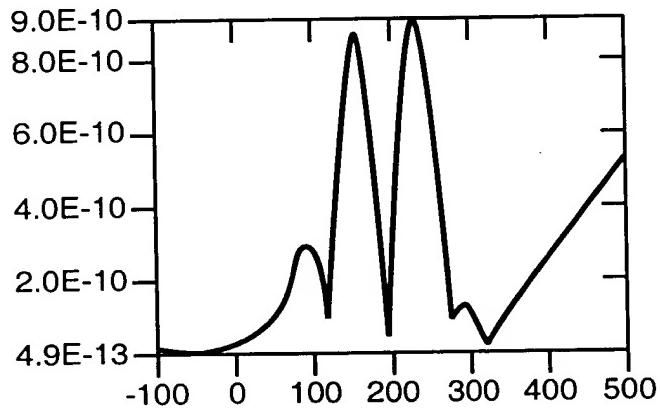


FIG._66

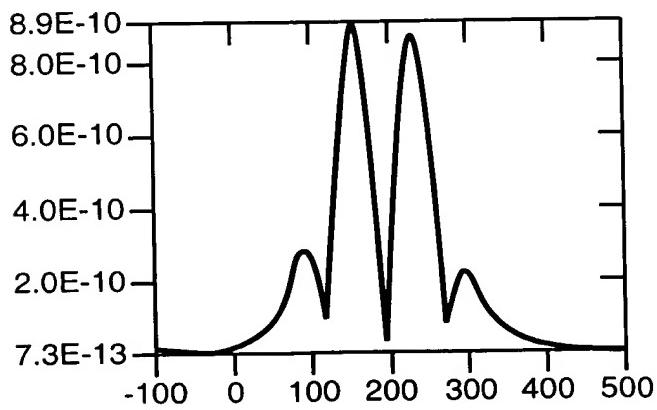


FIG._67

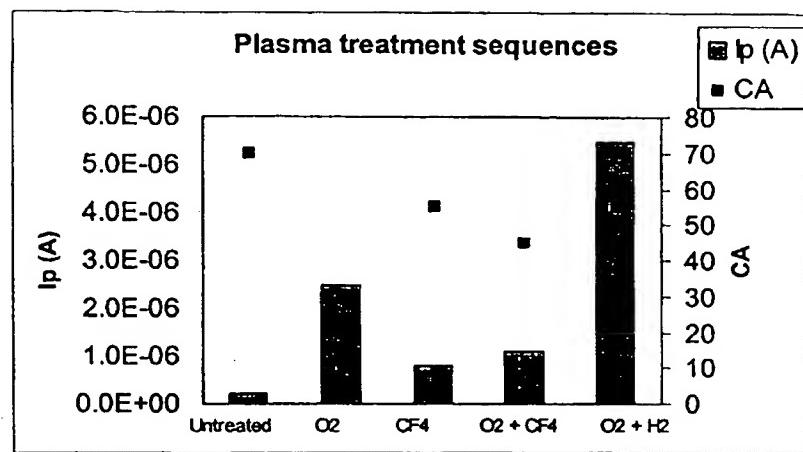


Fig. 68

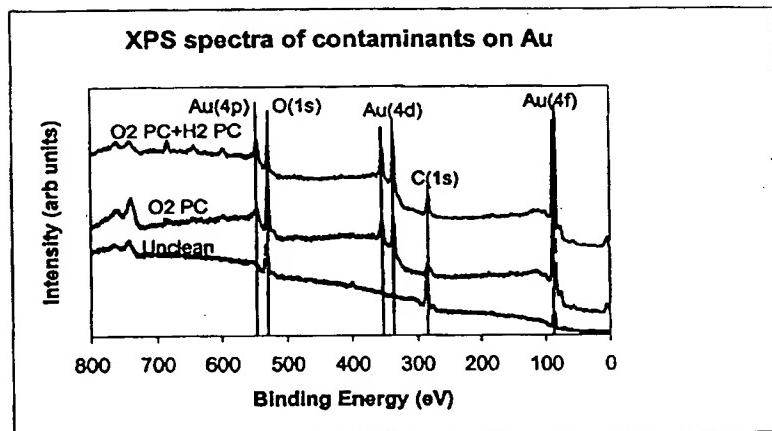


Fig 69